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16-PAGE SPECIAL REPORT

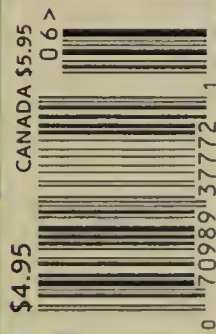
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And

Microsoft® Office

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You assemble your thoughts

Effortlessly.

You drag

A
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Words tables

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A

Charts graphics

From one program

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And drop them

Into another

Instantly.

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You run

Microsoft Excel calculations

In your Word document.

B
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You turn

Your Word document

Into a PowerPoint®

T
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Presentation.

You see everything

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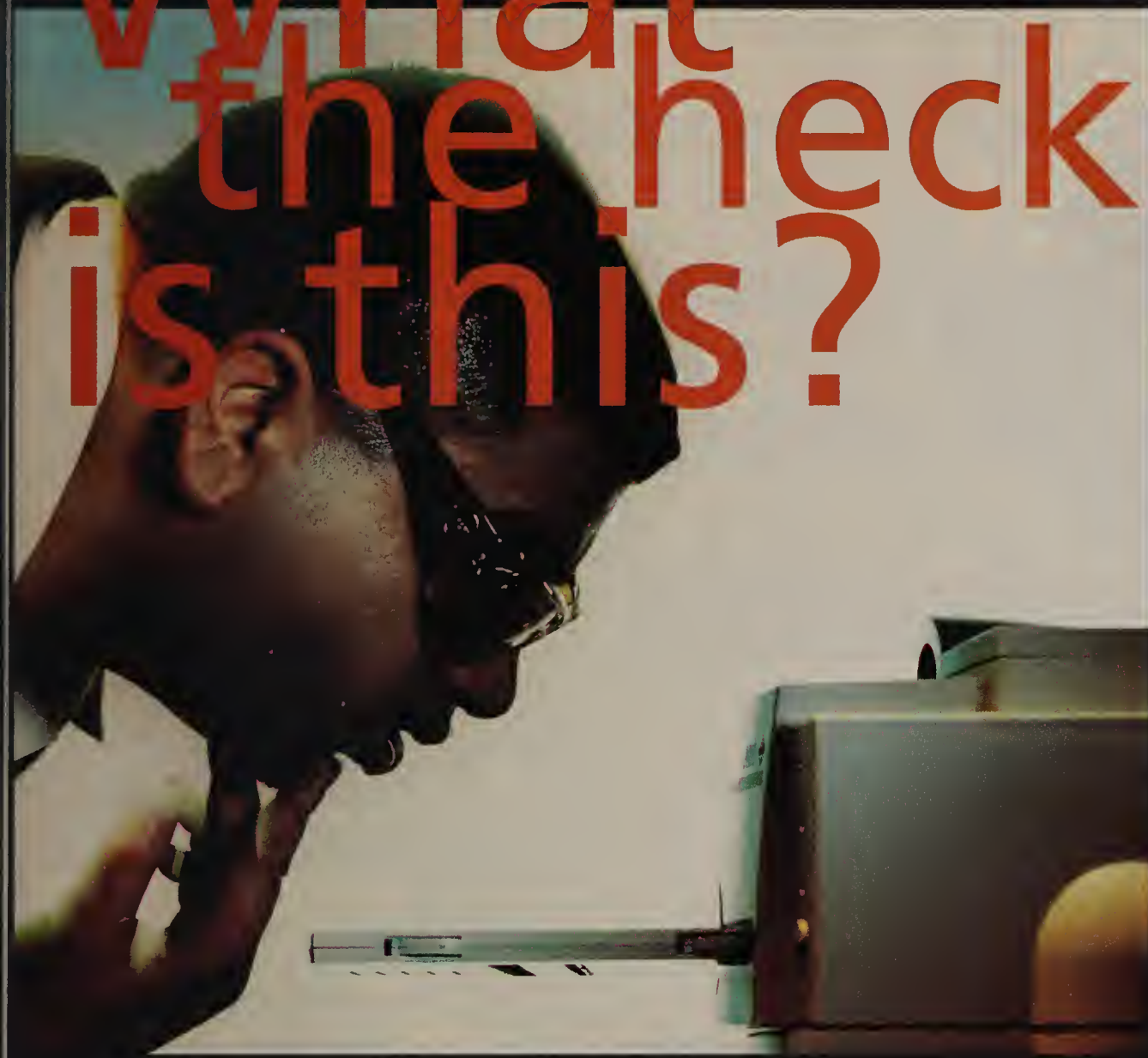
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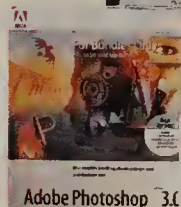
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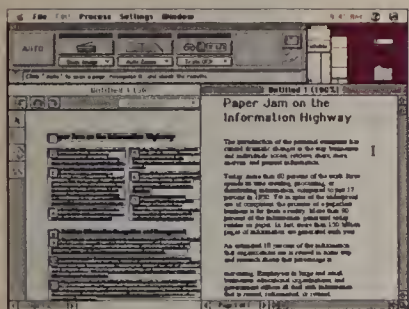
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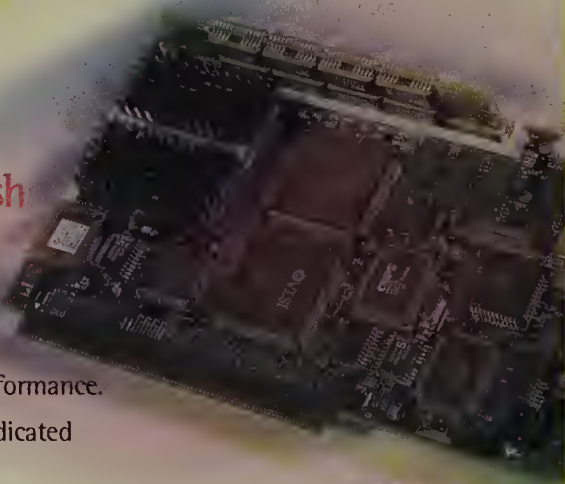
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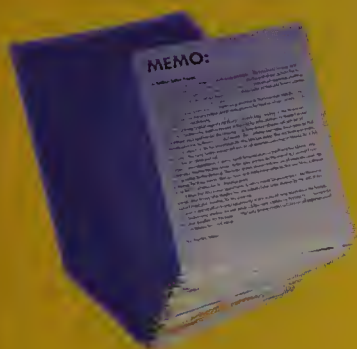
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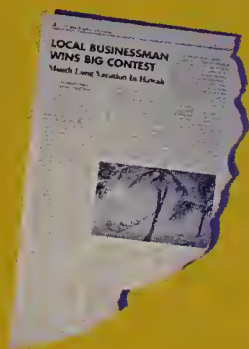
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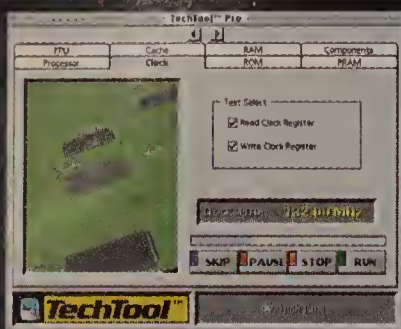


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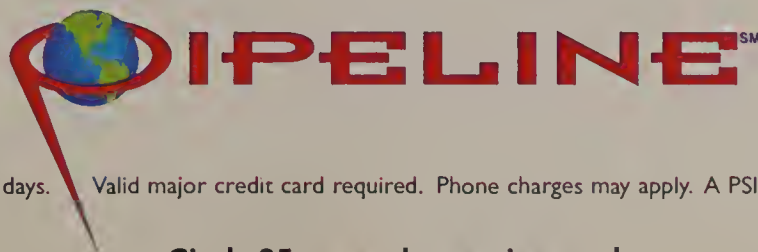
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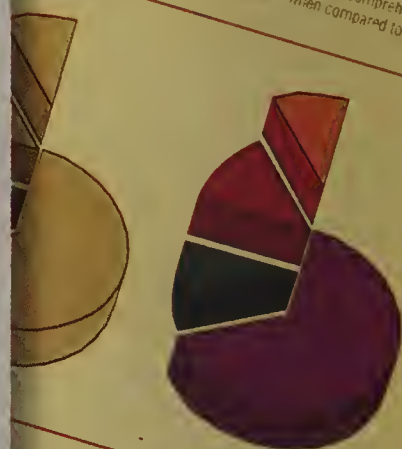
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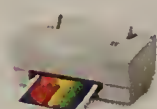
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Letters

The Truth about Upgrades

I USE A QUADRA 800 AND LATELY HAVE been feeling Power Mac envy. I have been looking into my upgrade options and am a bit confused. Is it true that Apple will be coming out with an 8500 motherboard replacement for my present one? If so, when? I phoned Apple and was told it is not available and that there is no information on when (if ever) it will be. However, in the back of your magazine, several advertisers claim to have 8500 motherboards now. What's the story?

BRIAN E. BOUGHTON
via the Internet

At press time, Apple had not released an upgrade board for the 8500, though the mail-order companies we contacted are perfectly willing to take orders. Apple's ability to provide logic-board upgrades has been hampered by a components shortage, first reported in News, October 1995. Whole systems are more profitable for Apple than upgrades, so expect these short-supply components to satisfy the CPU demand first. Perhaps as these shortages ease, the logic-board market will improve.—Ed.

The Marginalized Mac

THANK YOU FOR ADDRESSING A PROBLEM that is becoming a real burden to Mac Web publishers ("Descending into Babel, Web-style," *NetSmart*, March 1996). Windows Web publishers have had a three-month head start with Netscape plug-ins like Macromedia's Shockwave, though for the life of me I can't figure out why, since Microsoft's choice of AVI over MPEG or QuickTime only proves that when it comes to the Web, Microsoft still just doesn't get it. Many Netscape plug-in developers don't even plan on creating



Mac versions of their plug-ins. While most Web surfers are probably using Windows, Netscape and those plug-in developers seem to have forgotten that a large percentage of the innovative publishing going on is still done on Macs. Without innovative content, the Web is only a novelty.

DAVID LEVINSON
via the Internet

Keyboard Fixes

In response to reader Steve Mankowski, who wondered how to fix a sticky PowerBook keyboard (Letters, February 1996), we said we were stumped, and asked for readers' suggestions. Here's what we got.—Ed.

I HAD THE SAME PROBLEM WITH MY PowerBook 520: keys would not depress smoothly, and sometimes the computer would register two keystrokes

rather than just one. I noticed that the keyboard on my friend's PowerBook 520 worked perfectly. So I hastened into my Apple-authorized repair center before the warranty expired. Within a week my PowerBook was back with a new keyboard, free of charge. So, Steve, don't waste time looking for a third-party solution to Apple's defective keyboard, get thee to a repair center on the double!

CHUCK HENEERY
via the Internet

IF ALL ELSE FAILS, TRY DENTAL RUBBER bands. Any dentist who does braces has those little tiny rubber bands and should give or sell you enough to do the job for less than a dollar. Gently pry off each key, place a rubber band around the post, and replace the key.

I don't know if this will help with a PowerBook, but it used to be a great fix for the clackety and sometimes sticky keyboards on early portables like the Radio Shack Model 100.

CATHARINE BUSHNELL
via America Online

YOU CAN MODIFY KEYBOARD RESPONSIVENESS by tightening or loosening the two keyboard screws on the bottom of the case. The tool for the job is a Torx T8 screwdriver.

ALEX VIGDOR
via the Internet

A Matter of Rights

I WAS PLEASED TO READ DENISE CARUSO's article in last month's *Macworld* ("Civil Rights Activists Say, 'Sniff This!'" *Viewpoint*, May 1996). Your readers might be interested to know about the legal
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CORRECTIONS

- The correct phone number for Power Computing is 512/388-6868 (Reviews, April 1996).
- Hewlett-Packard's ScanJet 4c, not LaCie's Silverscanner II, lacks a comprehensive set of tonal-correction tools ("Scanner Solutions," March 1996).

challenges recently launched to oppose the Communications Decency Act.

In passing the Communications Decency Act this winter, the current Congress and President Clinton ignored the principle of free speech set forth in these words of the First Amendment: "Congress shall make no law . . . abridging the freedom of speech, or of the press." The new law prohibits the transmission of any material that is "indecent" or "patently offensive" and that might be available to anyone under 18 years old "through any telecommunications medium." It's worth noting that this provision of the more comprehensive Telecommunications Reform Act was ratified despite Attorney General Reno's insistence that existing laws provide ample means to prosecute obscenity law violations.

The Communications Decency Act of 1996 imposes greater restrictions on the Internet than could possibly exist on speech or the press. It even adapted a dead-letter criminal statute that made it a felony to distribute any information about abortion procedures or providers, applying the ban to Internet communications.

On the day the law was signed, it was legally challenged by a coalition of civil libertarians who widely decried the CDA as an unconstitutional infringement of constitutionally protected rights to speak, listen, write, and read. The Association of Publishers, Editors, and Writers, a West Coast-based organization, subsequently filed a second challenge with the primary goal of establishing that the Internet is a "unique communications medium, deserving unique First Amendment protection . . . [that] unlike the broadcast media should receive at least the same broad protection afforded to the print media." With regard to protecting children, coalition members believe that Internet blocking and filtering technologies now available can protect children from inappropriate material online. "Parents, not the United States Government,"

this coalition contends, "are the best and most appropriate judges of what material is appropriate for themselves and their children."

The two court challenges have been consolidated into a single case now before a three-judge panel in Philadelphia. The Justice Department has since agreed not to commence any prosecutions while the act is being challenged. A ruling is expected by summer at the earliest. Should that ruling be appealed, it will be heard by the United States Supreme Court.

For more information on the lawsuit, visit <http://www.hotwired.com/special/lawsuit> and <http://www.cdt.org/ciec/>.

JAMES WHEATON

Senior Counsel, First Amendment Project
Oakland, California

Mr. Wheaton and the First Amendment Project, a nonprofit public interest law firm, are representing the Association of Publishers, Editors, and Writers in the lawsuit challenging the Communications Decency Act.—Ed.

The Smell of Success

I JUST HAD TO WRITE TO TELL YOU how much fun I had reading "Confessions of a Macintosh Therapist" (*The Desktop Critic*, March 1996). After reading it myself, I felt inclined to read it aloud to my wife. She doesn't even like computers that much but she too got a chuckle as I explained each story in great detail.

Thanks for the info and the laughs. I love to read *Macworld*—I even like the way it smells.

STEVE SCOVILLE

via America Online

You know, we've received several letters that mention the wonderful smell of Macworld. Is it, as one reader suggested, the smell of new technology and power, or just the mundane but nevertheless still enticing aroma of paper, ink, and binding glue? Are these the same people who as children loved the smell of freshly mimeographed paper?—Ed.

Where's the Trackball?

I OWN AN OLDER POWERBOOK. LATELY I've noticed its distinct lack of speed compared with my desktop Power Mac. I recently played around with a new Power-

continues

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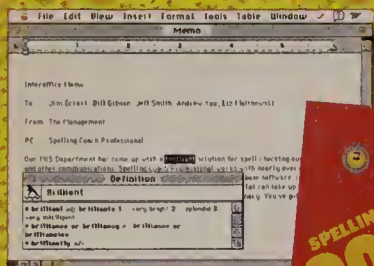
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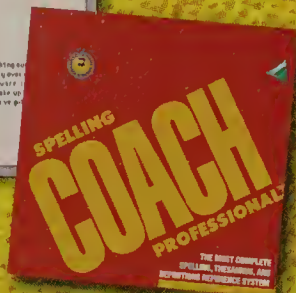
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LETTERS

Book 5300c and loved the performance, but I hated the TrackPad. It's simply not accurate enough to satisfy my mobile CAD needs. On the other hand, I love the trackball on my current PowerBook—I wish my desktop Power Mac had a little trackball in front of the spacebar. Sadly, after browsing Apple's Web page, it was very clear to me that the TrackPad is here to stay.

I am going to have to upgrade my laptop sometime soon, but the thought of paying a fortune for a PowerBook with an input device I hate simply horrifies me. Somebody please give me a portable laptop with a trackball!

DAVID M. DOWNEY
via the Internet

Can't help you get a 5300-series PowerBook with a trackball, but you could try the Mini-Trackball from Fellowes Manufacturing (reviewed way back in the March 1992 issue). It's small enough to fit in the palm of your hand, or you can use Velcro to attach it to your PowerBook. Call Questec at 805/237-6262 or visit its Web page at <http://www.slonet.org/~hwright/fellowes.html> for more information.—Ed.

Can the Preachiness

YOUR REVIEW OF BUNGIE'S MARATHON 2 lists "Ultraviolent; promotes 'every man for himself' ideals in some multiple-player options" as cons (March 1996). Yes, you should warn parents that Marathon 2 may not be the right game for their children, but I see no reason for a reviewer to impose his morals and ideals on a product, or to assume that we in the Mac community don't have enough moral fiber to decide for ourselves what is right and wrong. Want a real con for Marathon 2? Even at the smallest screen size and lowest, most pixelated resolution, Marathon 2 on an 040 Mac such as my Quadra 660AV is barely playable over an AppleTalk network.

ARAM CRETAN
via America Online

FOR THE MOST PART, FRED DELISIO did a fair job evaluating Marathon 2. However, it was ridiculous for him to award it only four stars for the sole reason that it was too violent for his tastes. If Mr. DeLisio doesn't like violent games he shouldn't be reviewing them. Game makers have every right to make violent

games, without being penalized for it, provided those games are aimed at mature audiences.

MATT SEGUR
via the Internet

Multimedia Speakers

I WAS PARTICULARLY INTERESTED IN your March 1996 *Buyers' Tools* column, "Multimedia Speakers," especially after reading, "And if you already have a high-quality stereo system in the same room as your computer . . . [j]ust hook up an audio cable from your Mac to your system, pop in your favorite CD, relax, and enjoy." I connected one end of an audio cable to my Quadra 605 sound-out port, and the other to my JVC stereo receiver. But now I find that every time I close or open folders, I hear a scratchy static sound from my stereo. My Sound control panel indicates only built-in sound in the Sound Out setting. Do I need software for a static-free connection?

MEL BECKHAM
via the Internet

Check to make sure the audio cable is plugged in all the way, or try another audio cable. Also check the Volume settings in the Sound control panel to see if you're blasting out sound that way.—Ed.

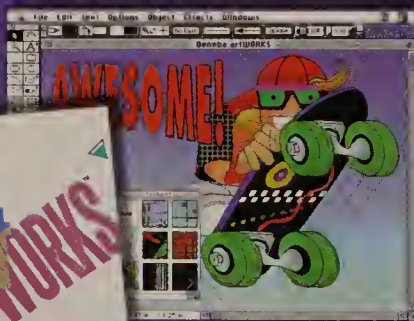
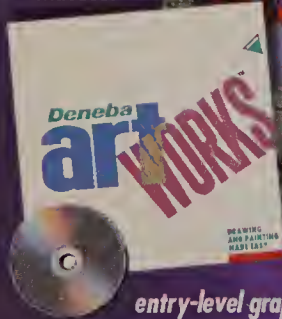
REGARDING MULTIMEDIA SPEAKERS, isn't the suggestion that one use an audio cable to connect a high-quality stereo system to one's Mac to play an audio CD just a little bit silly? Under what circumstances would someone want to play a CD on a Mac if there's a high-quality stereo system sitting there? I'm as big a technophile as anyone else, but that seems to me to be taking things a bit far.

SHARON GORDON
via the Internet

Sharon, meet Mel. Mel, Sharon.—Ed.

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*Mark Hall
Editor in Chief
Macweek
July 24, 1995*

"Canvas 5 sports a sleek interface that packs the power of numerous programs without confusing the user...Canvas equals Adobe Illustrator and Macromedia FreeHand... Although it doesn't offer all the bells and whistles of Adobe Photoshop, it does support a fairly complete array of tools for image editing, including masking."

*Sean J. Safreed
Senior Graphics Editor
MacUser Magazine
October, 1995*

"Canvas 5, what a product! Image editing, page layout, presentation and tech illustration wrapped into one easy to use interface. This is the true Swiss Army knife of any graphics applications out there. Deneba has done everything the graphics community has asked for."

*Keith Boncek
Director of Computing
Cornell University
August, 1995*

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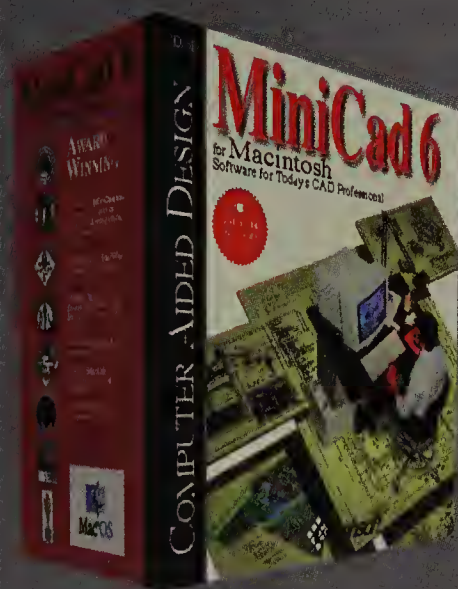


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State of the Mac

by Adrian Mello

Welcome to the Age of Digital Expression

CREATIVE COMMUNICATIONS ARE REPLACING DATA CRUNCHING

JUST WHEN WE WERE GETTING used to living in the Information Age, I've started noticing signs that it may only be a transitional phase—a short-lived cocoon of an era, from which we are beginning to emerge into an Age of Digital Communications. And like the transformation from larva to butterfly, this change is something profound, not merely an accretion of processing power and speed. Personal computers are evolving rapidly into powerful media for expression, yet we still seem to value them largely for their ability to crunch data as if they were small factories spitting out what-if scenarios and statistical reports. The promise of personal computing lies not in the ability of individuals to build isolated repositories of data but in the way computers empower people to communicate ideas.

If you're skeptical that this transformation is under way, consider one way our computing habits are already changing. We now routinely exchange E-mail addresses and Internet URLs—probably as often as we exchange telephone numbers—not only in the office, but also in schools and homes. And whether we go in search of critical information or simply enjoy some recreational browsing, there's little doubt that the Web has captured our imagination and set our creative juices flowing. The Internet enables us not only to send messages to members of our community, it also lets us wander about and find or create new communities based on that which intrigues us: medieval mysticism, grunge rock, Civil War battle reenactments—you name it.

The Internet, and more particularly the World Wide Web, have truly brought about a sea change in the way people relate to their computers. Something in this new technology inspires us not only to glean information from the Net's myriad sources but also to contribute some-

thing of ourselves—to set up a Web site or post a home page that communicates to fellow netizens our ideas, our interests, or just our quirky view of the world. Here's the new formula as I see it: **Creativity + Communications = Expression.**

In the past, computer communications was mainly plumbing, simply piping so many numbers and so much data from one computer to another. With digital imaging, desktop publishing, MIDI, multimedia authoring, desktop video, and the like, personal computers have evolved into highly versatile creative tools, and along the way changed the nature of computer-based communications. Communication is now a far more sophisticated function of computing than it was in the

anticipate the dissolution of barriers to electronic commerce miss the Web's real significance. The possibility of doing business in new ways is indeed worth exploring, but what really captures the imagination of those who build and browse Web sites is the power of expression. What the Web does is provide a platform, a virtual performance space, that is open to all comers. That is something new under the sun, and what's astonishing is how eagerly the general computing public is flocking to this performance space, both as audience and as creators.

In this regard, the Web echoes the Mac's own early development. Its underlying technology puts an inspiring, enticing, and usable set of tools within reach of the mass of computer users, empowering them to go beyond simply processing information to repurpose, design, publish, and express.

The Revolution at Work and Home

As a model for sharing ideas, the Web is so compelling that many businesses and organizations are beginning to structure internal networks, or intranets, based on the concept. This direction should help businesses continue the ongoing trend toward distributed decision making. Most

businesses are improved when management encourages creativity and involvement throughout the organization, and that depends on good communications.

Changes in the way we communicate and create also touch our personal lives. This struck me recently during a conversation with David Hindawi, former president of Software Ventures.

Both longtime denizens of the Mac-



past, providing a means for interpersonal collaboration and individual expression. As the platform of choice for content creators of all types and as a principal agent for bringing each of these technologies to the desktops of average users, the Mac has been at the center of this evolution.

The Message Is the Medium

Pundits who fantasize about how cyberspace will replace physical reality or who

continues

intosh universe, David and I both have kids, and as it happens, we're both remodeling our homes. We agreed that, for all the headaches of remodeling, we're both thrilled that opening up our walls to ready them for wire gives us an excuse to network our entire homes. Dyed-in-the-wool technophiles, we went on and on about category 5 wire and ISDN routers. But in truth, our excitement has less to do with wire than with the prospect of expanding our children's horizons and

enriching our family life. Connecting our households to the Net provides a way to show our kids how to interact with a bigger world. We look forward to encouraging their curiosity and initiative by showing them how they can explore the Web and bring home treasure. The information they gather for homework or hobbies, they can put to creative use. For example, my oldest son is an avid mountain biker; he'll be able to visit Web sites and get the latest on biking gear, race

courses, and the like, and even to create his own custom book.

The Mac's ease of use is generally considered a virtue in its own right, but it also plays an important role in the Mac's success with creative people. It makes the Mac a great medium for expression partially because computing doesn't get in the way of ideas. Authors, artists, designers, and other creative types can focus on their own vision, freed from the intricacies of their computers to explore and try things. This has been true since the Mac's very introduction; witness the comment by Bill Atkinson, one of the Mac's original creative geniuses, that the Undo command was one of the Mac's most important features because it gave users the freedom to experiment. The Mac was also designed for easy-to-use communications, with AppleTalk—by far the easiest networking protocol to use—built into every model, and AppleTalk Remote Access simplifying remote connections.

Onward and Upward

All this means the Mac is an ideal vehicle for the new age of communications. So what's the next step?

Apple and other Mac developers should focus on advancing the standard for ease of use, integration, and flexibility, removing any remaining barriers to inspiration and experimentation. Clearly some companies are already on this track. Adobe Systems' PageMill and SiteMill, for example, make it easier to create new content for Web sites. Other companies are aiding the process by helping Net surfers organize and individualize the information they find. Expect to see changes in other products—spreadsheets, databases, statistics packages, and so on—that were originally conceived in the information age. These products are likely to evolve to let users share data more easily with colleagues and customers.

Who can foresee what will emerge once we've all learned to use the interactive quality of the new digital media to the fullest advantage? One thing seems clear, though: by digitally sharing our creative processes we will collectively advance the technology and our expressive abilities. And that's the difference I see between the Information Age and the Age of Digital Communications. **m**



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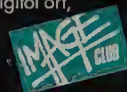


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Apparently, we're not the 56 million users consti

"Leadership in the software industry requires a strong commitment to cross-platform support. Oracle will continue to invest in supporting the Apple platform to further our position as the world's leading supplier of information management software."

Larry Ellison, Chairman and CEO, Oracle Corp.

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Bill Gates, Chairman and CEO, Microsoft Corp.

"Macromedia and Apple have worked together for ten years to develop the market for graphics, multimedia and video. The Macintosh continues to excel as a leading platform for creative professionals worldwide. Macromedia is committed to the Macintosh and the millions of customers that depend on it."

Bud Colligan, Chairman, President and CEO, Macromedia, Inc.

"Macintosh contributed to the first publishing revolution. This summer, when we introduce our Internet and multimedia design tool, QuarkXmedia, users can capitalize on the next revolution: interactive publishing. Macintosh is one of many important tools for our customers and Quark will continue to develop software for them."

Tim Gill, Chairman and Senior Vice President of Research and Development, Quark, Inc.

"Corel is excited about the business prospects we see for supporting the Macintosh platform. Over the next few months, we will be releasing CorelDRAW for the Mac, as well as continuing to enhance OfficeSuite and our many other products for the Mac. We think the Mac will play a major role in our future."

Michael Cowpland, President and CEO, Corel Corp.

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Scott Cook, Chairman, Intuit

"At Edmark, the Macintosh is an important platform, thanks to its wide use in both the home and education markets. We are committed to developing high-quality educational software for the Mac, and have a very exciting summer and fall season of new products. We look forward to its continued success."

Sally Narodick, CEO, Edmark

e only ones who think ates more than a niche.

The Macintosh has always been and will continue to be a critical component of the Notes cross-platform strategy. We will continue to keep it at full parity with our Windows client platforms."

**Jeff Papows, Executive Vice President and
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"Brøderbund Software remains strongly committed to the Macintosh platform. Over the years, we have delivered many exciting and market-leading products for Macintosh, and it is an important component of our strategy today. The Macintosh provides a quality experience that matches up well with the quality we always strive to deliver to our customers."

Doug Carlston, CEO, Brøderbund Software, Inc.

"America Online got its start with Macintosh, and we continue to make significant investments to serve the 1 million Mac members we now have. When we release AOL 3.0 later this year, it will be clear to all that the 'Mac is back' at AOL!"

Steve Case, Chairman and CEO, America Online, Inc.

"For all aspects of information publishing, Adobe and our customers prefer the Macintosh. The Mac's ease of setup and use distinguish it among personal computers. Adobe will enthusiastically support the Mac with our applications now and in the future."

**Dr. John E. Warnock, Chairman and CEO,
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Circle 15 on reader service card

The Desktop Critic

by David Pogue

The Desktop Critic Secret Reviewer's Notebook

TALL BUT OH SO TRUE TALES FROM THE TRENCHES

I'VE WRITTEN HUNDREDS OF Mac product reviews. I've opened enough shrink-wrap to qualify for my own personal landfill, spilled enough Styrofoam peanuts to feed a herd of Styrofoam elephants, and doled out enough *Macworld* stars to populate a planetarium. About every third E-mail I get these days is from a reader inquiring about the reviewing process. Does the reviewer get to keep the software? (Yes.) What about hardware? (No.) Do you *Macworld* people get free Macs? (No.) If you've worked for the company, can you write the review? (No.) Does advertising affect a review? (No.) Is getting free stuff, and getting paid to write about it, the cushiest job on Earth? (No—fourth-greatest, after Talk Show Host, Member of Congress, and Guy Who Wrote Netscape Navigator.)

Clearly, few people know what really goes on behind the scenes in product reviewing. For example, you may not know about the highly developed life form known as *Sapiens productis managerius*—the product manager. The product manager's duties generally include gauging the marketplace, guiding the product's development, and serving as the reviewer's contact. Since this lucky individual's continued employment often depends on the product's success in the marketplace, the product manager, or PM, may go to stunningly clever extremes in the effort to spin a review positive-ward.

The time has come to shed some light on the way reviews work, on the way PMs work, and on the way life works. Names have been changed just for fun.

Software to Order

We reviewers aren't supposed to divulge our official opinions to anyone until the article appears in print. But years ago, Benjy, a PM, asked me what I thought of his product, a database, while the review was still in progress. After a moment of

squirming, I said cautiously, "Well, I need to keep working with it."

But Benjy continued to prod. "Any ideas for our next version?"

It seemed an innocent-enough question. "Well," I shrugged, "a list view would be nice."

Forty-eight hours later, a Fed-Ex man appeared at the door, bearing a new copy of the program: version 1.1. It was identical to the version I'd been testing—except now it had a list view. Some programmer had had a *very* busy weekend.

Benjy called. He thanked me for the list-view idea and asked if there was anything else I'd like to see in the program. I hedged; he prodded.



"OK, well," I managed, "it'd be nice if you could mark and print subsets of your cards."

You guessed it: within two days, version 1.1.1 arrived, complete with mark-and-print features.

This loony cycle went around a few more times, the little company writing the *software* to accommodate the *review*. I knew this wasn't quite the way the reviewer-vendor relationship was supposed to work—but I really thought the software was getting better. At last the review

deadline came, and Benjy stopped adding new features. That program was probably the only version 1.1.1.1.1 ever sold.

Sealed for Freshness

Another company fervently wanted our review to appear simultaneously with its new program's release. Of course, that's impossible; because of editing and shipping, Mac-product magazine reviews are written weeks before the issue appears.

But Sheila, the PM, had a great idea: she'd send me a late beta-test version of the program, and I could review that.

I explained to Sheila that *Macworld* reviews only final, shipping software versions. Too much (or everything) can change between the testing version and the final one. "If it isn't shrink-wrapped," goes our rule, "we don't review it."

I didn't hear from Sheila again until a week later. She said she was finally ready to send me a review version of the program, shrink-wrapped and everything.

I eagerly opened the package, installed the software, and got to work. I was halfway through writing the review when I happened to glance at the program's Get Info box. There it was, plain as day in 9-point Geneva type: Version 1.0b18.

Sheila, clever woman, had sent me a beta-test copy of the software after all—and shrink-wrapped the box!

Friends and Family

One program I reviewed was awful. I found it difficult to believe that, as Frank the PM insisted, hundreds of companies were happily using this program every day.

Finally, I asked Frank if he'd mind providing me with the names of a few of these happy users. "Not at all," he said.

continues

Sure enough, he called back a few days later with three names and numbers.

The first user said he was thrilled with the program. Only one problem: he worked for the Canadian division of the same software company. Hardly impartial.

The second guy, fortunately, didn't work for the software company. He was, however, Frank the PM's *brother*.

The third guy had no such ties. He was wild about the product. On and on he raved: "It's so neat, the way those menus

drop down . . . and I love the Apple menu, with that Calculator, and that devilish Puzzle . . . and that cute little Trash Can!"

I didn't have the heart to tell this new Mac user that he was crediting Frank's program with every innovation of the Mac.

When Software Dreams Come True

Apparently, I need to do a better job indicating when I'm describing a real product and when, as in my April column, I'm describing products that don't exist. *Macworld* has been deluged with calls for information on the fictional *ExtensionsWorld* magazine and PriceDex Web page. Read my fonts: They don't exist.

On the other hand, they may soon. One guy has already registered the name PriceDex.com and is pursuing the concept. I've also been alerted to two *ExtensionsWorld*-type Web pages: <http://www.gse.ucla.edu/staff/DEF/PCIpurge.html> and <http://www.webcom.com/level6>.

Finally, get this: In my January 1993 column, I longed for "a truly gorgeous, graceful, great [disk cataloger]. Something that reads your floppies fast, makes a searchable, collapsible disk list, and prints nice-looking labels. . . . Is that such a tall order?"

Evidently not for MIT sophomore Mark N. Pirri. Inspired, he taught himself to program, and after three years came up with DiskTracker: gorgeous, powerful, and incredibly useful. (Available in the *Macworld* Online software libraries of America Online and the Web [<http://www.macworld.com>].)

Best Supporting Actor

Good PMs, like good criminal lawyers, must sometimes be actors, making their case with conviction and passion when they're representing a loser.

I'll never forget the hardware gadget that instantly fried my Mac. Afterward, the computer wouldn't even start. In hysterics, I called the PM.

He told me to calm down. Sure, a few of these units had caused this fiery surprise. But big deal—the design problem had been fixed. "It's still the best product of its kind," he insisted. And when my review appeared, he called up to chew me out, saying I'd been overaffected because my own personal Mac had been nuked.

But the punch line came several years later. I ran into that PM at a *Macworld* Expo. Of course, his old company didn't exist and he had moved on. He grinned

continues

Little known Mac fact #31

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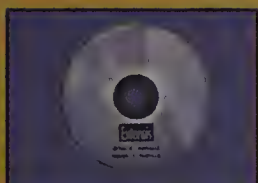
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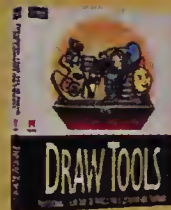
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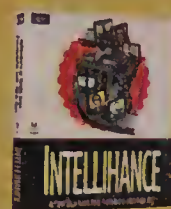
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Circle 13 on reader service card

and threw his arm around my shoulders.

"Wow, was that gizmo a turkey, or what?" he laughed.

My jaw hit the floor.

"Yeah," he said, "I couldn't tell you at the time, but your review was right on. I wouldn't have used one of those units on my own Mac if you paid me!"

What Goes Around . . .

I don't hold it against PMs for trying to paint a rosy picture of whatever they're

representing; that, in fact, is their job.

This point was brought home to me in the early days of laser printers. I was supposed to review one—and wow, was it a dud: a multithousand-dollar laser printer that, among other failings, could print only *two fonts*. Jenna, the PM, tried valiantly to explain the positive qualities of her product. But in essence, her message boiled down to, "Be gentle with us."

I panned the printer.

Later, I called the company to arrange

the return of the printer. But Jenna, I was told, no longer worked there. The underling who answered the call implied that my review had had something to do with Jenna's early retirement.

I was sorry that Jenna had been made a scapegoat. And I hoped that, wherever she was, she was managing a gadget that was a little easier to love.

The PM's Revenge

On one memorable occasion, a review I wrote angered the CEO of the company that made the product. And he, it turned out, was a *Macworld* advertiser. He demanded a retraction—or else he would cancel his ad contract.

But he obviously didn't know about Separation of Church and State. That's *Macworld's* policy whereby, in the interest of impartiality, the magazine's editorial and advertising departments are isolated from each other. To prevent bias, no reviewer knows whether or not the product's maker advertises in these pages. Therefore, the editors told this particular advertiser, no retraction.

I smiled, gloating. So what, I thought, if the magazine lost a few ad bucks—a small price to pay for truth and justice! Long live Separation of Church and State!

But imagine my shock when, one morning over a bowl of Cheerios, I opened a subsequent issue and found a full-page *rebuttal* advertisement from that same company. It began something like, "Our phones haven't stopped ringing since David Pogue's so-called review of our product appeared . . ."

I stared at the ad in disbelief. A single Cheerio fell off my spoon.

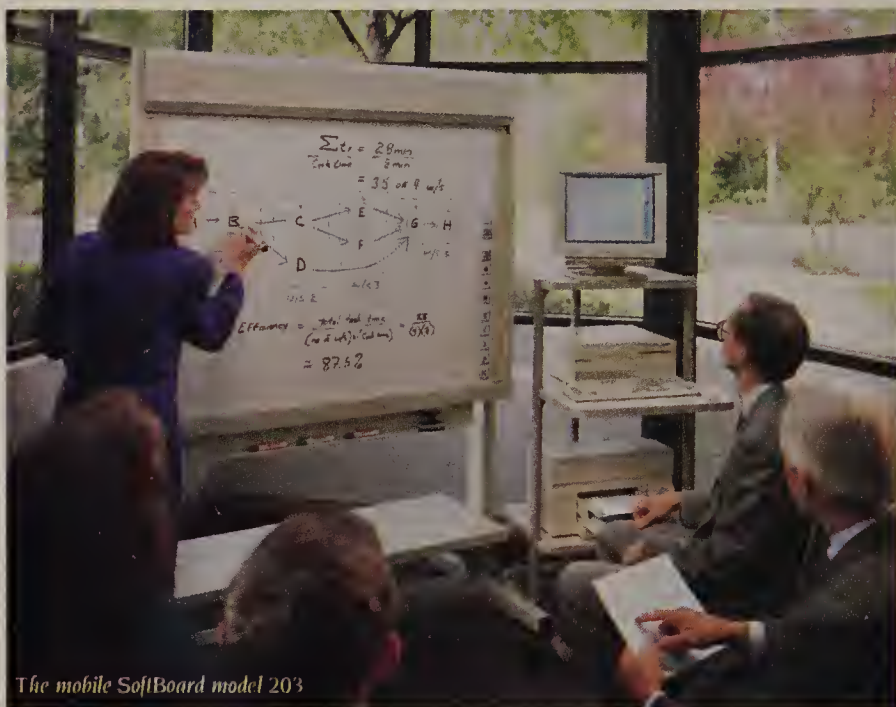
I called my editor in a froth. "Why didn't you protect me from this public attack? How could the magazine possibly let this happen?!"

Naturally, my editor shrugged. "Hey—Separation of Church and State!"

The Upshot

Don't get me wrong: 99 percent of the world's PMs are up-front, helpful, with-it people. But even the zealous, sneaky, or vengeful ones get my salute—as long as they're passionate. For it's passion—pure, irrational, market-share-be-damned passion—that makes the Mac great. **m**

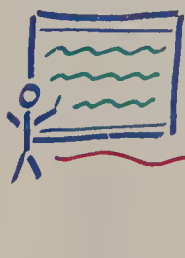
Contributing editor DAVID POGUE'S first novel, *Hard Drive*, is a Mac techno-thriller. It has just been rereleased as an Ace paperback.



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News

systems

Apple Unveils Its New Platform Design

COST-EFFECTIVE
ENTICEMENT FOR MAC
CLONE MAKERS
by Charles Piller

As the Mac-clone makers begin shipping a broad variety of Mac OS systems, Apple is developing a new computer design based on the current Mac platform, but using a greater number of cost-saving, off-the-shelf parts. It hopes to finish the new Mac-only platform ahead of the PowerPC Platform (PPCP)—which will be able to run several operating systems (including Windows NT and the AIX variant of Unix) and will form the basis of the next generation of Macs, due out at the end of this year. But the new architecture, called the Macintosh Licensing Design, could save Mac-clone buyers a lot of cash within the next few months.

"We're working on this design to satisfy a lower price point that our licensees need," says Lamar Potts, Apple's licensing vice president. "It's truly an interim solution until the PPCP is in place." Potts



The newest Mac-clone maker, Umax Computer, is set to ship its 150MHz screamer, the SuperMac S900, in May.

says the PPCP will support very low-cost designs, and therefore he does not expect a long-term future for the Macintosh Licensing Design.

The design would "leverage industry-standard ASICs [specialty chips that manage functions such as SCSI or serial ports], power supply, and the PCI bus that you need for the PPCP, but leave out the stuff that's needed to run AIX,

Solaris, and Windows NT," says Pieter Hartsook, a leading industry analyst. Hartsook says that Apple is tailoring the platform for the price-sensitive consumer, education, and overseas markets.

Why a New Platform? Apple apparently hopes the new design will help pump up the clone market in the wake of IBM's recent moves away from a full commitment to the

PowerPC Platform. Big Blue recently shut down its Power Personal Systems division, the group responsible for PCs based on the PowerPC CPU. It also discontinued efforts to port OS/2 to the PowerPC, and ceased all development of its Power Personal Series desktop units.

"As a corporation, IBM is still very committed to PowerPC," says Rich Oehler,

an IBM Fellow involved in the company's strategic planning. "We're very quickly moving all of our AS/400 [minicomputer] products to PowerPC," and the IBM RS/6000 workstation-and-server family is based on the PowerPC 604 processor.

Still, the IBM news hardly reads like a vote of confidence for the PPCP. Despite renewed rumors that a large computer maker—possibly Dell, Compaq, or Gateway 2000—is interested in licensing the Mac OS, Hartsook remains skeptical that a large company will jump in now. "[IBM's] clearly stated, weakened support for the PowerPC Platform, with the decision not to put OS/2 on PowerPC, and the dissolving of the Power Personal systems—these have very negative implications for the Mac-clone market," Hartsook says. "If I was Compaq or another large company, and heard that the founder of the PowerPC architecture [IBM] has decided that it's only appropriate for workstations, I'd have reservations about getting into that market."

And unless a big company signs on to the PPCP, Hartsook adds, "at the end of the year [the PPCP] is going to look like a Mac-proprietary platform," tantamount to the current Macintosh hardware design. This is because the workstation-and-server mar-

continues on page 43

online

Find Your Friends Via the Web

LET YOUR BROWSER DO THE WALKING

by Cameron Crotty

Lost track of a pal in Peoria? Want to send E-mail to a girlfriend in Galveston? Online directories have been around awhile, but with the World Wide Web's providing a cheap interface, this may be the year you let your fingers do the walking.

Directory Differences So far, Internet directories fall into two categories: those that list physical addresses and those that don't. An example of the former, Switchboard (<http://www.switchboard.com>), has licensed more than 90 million names and (mostly physical) addresses from Database America. Switchboard also provides Knock-Knock, a nifty privacy-enhancing feature: registered users (at no charge) can request that Switchboard forward E-mail without revealing the sender's true E-mail address.

Far more common are directories that focus on E-mail addresses. One such



directory, Bigfoot (<http://bigfoot.com>), started up this spring and claims to have compiled a database of 3 million names. Other lists competing for space include WhoWhere (<http://www.whowhere.com>); LookUp (<http://www.lookup.com>); Four11 (<http://www.four11.com>); and Okra (<http://www.okra.com>), which began life as a research project at the University of California, Riverside.

How They Get Your Number E-mail directories raise some interesting privacy issues, including how companies collect addresses. All the services practically beg visitors to register and add or update their personal information, but nearly all are also much more proactive—for instance, using the Unix Finger command to query servers over the Internet and combing names and addresses out of Usenet newsgroup posts. The information they gather is publicly available, but many Internet users are not aware of this.

There also remains a question, given the lack of a central E-mail authority, about whether the directories can be up-to-date enough to be more than a novelty. Michael Griffith, a member of the computer science department at UC Riverside and a key player in the Okra project, thinks so. "I doubt that there will ever be a definitive solution to this problem," says Griffith, but he defends his service: "We [search] everything so that the user doesn't have to. I think you will see the freshness of data to be one of the selling points of directory services in the next year."

industry

Apple Loses \$700 Million

AMELIO WRITES OFF UNSOLD MACS, PREPARES FOR RESTRUCTURING

by Tova Fliegel

Apple Computer expects to lose \$700 million for the fiscal quarter that ended March 31—ten times the loss that caused a panic in January and led to Michael Spindler's ouster as CEO, and about three times what industry analysts were expecting.

Apple CEO Gil Amelio attributes half of the \$700 million to write-offs for unsold inventory and one-quarter to restructuring charges. The rest of the loss is for lower-than-expected earnings on the Macs that the company did sell. Amelio also says that the company's problems are fixable and that he is prepared to take action.

Industry sources say that Apple has in place a task force

continues



Mac Clones Lead Performance Race

■ Best result in test.
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Results are times as fast as a
Centris 650 (Centris 650 = 1.0).

With the three Mac clone makers all using PowerPC 604-based systems, you now have several choices for top speed. Umax's 150MHz system should ship in May, while Power Computing's is available now. DayStar's Genesis should also be available in a 150MHz version by the time you read this; the tested version runs at 132MHz. Apple should also have a 150MHz version of its Power Mac 8500 this spring; we tested the current 120MHz version. For details on Macworld Lab's system tests, see "How Each Mac Stacks Up," page 110, February 1996.—Macworld Lab testing supervised by Mark Hurlow

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Umax SuperMac S900 prototype	5.1	4.9	7.5	2.4
Power Computing PowerWave 604/150	4.9	4.8	7.4	2.2
DayStar Genesis MP 528	4.3	4.3	6.0	2.1
Apple Power Macintosh 8500/120	4.2	4.3	6.0	1.8

Sneak
PEEK

Brutish FoxPro Gains Some Grace

BY CHARLES SEITER

From client/server developments in traditional Mac relational databases like ACI US's 4th Dimension, to introducing the Mac to multiplatform client/server powerhouses like JYACC'S JAM and PowerSoft's PowerBuilder, the stakes have recently been raised in distributed database computing. Microsoft (800/426-9400) is trying to claim a commanding position in this new competition by introducing the all-new Visual FoxPro 3.0. It features a real Mac interface and graphical, object-oriented programming, while retaining FoxPro's traditional brute-force speed advantages. I've used a prototype of the new FoxPro, and I'm impressed.

FoxPro has long been a champion at indexing and retrieval of data in large files; in some Mac-world Lab tests, the current version performed basic searching 50 times as fast as its closest rivals. But FoxPro's heritage as a product with roots in DOS-oriented

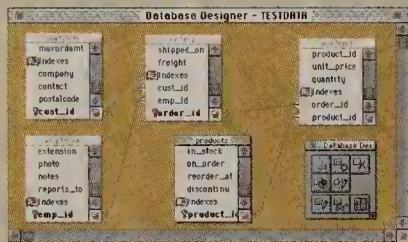
dBase clearly shows—despite friendly menus and some graphical interface elements, a typical FoxPro program consists of hundreds or more of relatively short text program files defining the database elements—a mind-numbing arrangement for most people.

The Visual FoxPro overhaul consists of three main elements: support for a class library (with proper inheritance, encapsulation, and context-specific polymorphism); a new Project Manager for class libraries and code (using Word 6.0-like tabbed panes); and graphical designers for database structures and form, in which dragging and dropping rather than typing code become the main activities in designing files, relational links, and user interfaces.

When updating earlier FoxPro 2.6 projects, most developers will find the graphical database designer to be a big help in quickly adjusting structures for database performance, and they will find the forms designer comparable to the luxurious input/output design environment of 4D. Both these designers are in fact long-overdue, much-demanded features.

What takes a bit more familiarization is worthwhile use of the class libraries. A detailed examination of the relatively few classes provided by Microsoft helps you see how to set up some practical classes for structures that occur in almost every business database.

Visual FoxPro also offers the first FoxPro support for AppleScript, Apple Guide, QuickDraw GX, and QuickTime. However, if developers avoid using any of these Apple-specific riches except QuickTime, they will have a database that automatically works as is under Windows, as well as on the Mac. Visual FoxPro is scheduled for a May release, at a price of less than \$200.



Visual FoxPro's new drag-and-drop interface lets you link database elements easily.

to handle the inventory backlog, and the company is investigating such options as selling off the inventory to foreign markets or deeply discounting the Macintoshes within the United States.

Although the \$700 million loss is higher than expected, industry observers were impressed with Apple's handling of the situation, saying that Apple has taken a direct approach in the announcement.

"They seem to have their wits about them," says Pieter Hartsook, who writes the respected *Hartsook Letter*. "They are much more organized than I've seen them in the past, and they are not acting like this is the end of world. Three months from now, who's gonna remember the \$700 million number? It's this kind of management that can marshal resources that has long-term implications for Apple's overall success. That's the most significant aspect of this situation."

Several developers and analysts agree, saying that the announcement of the expected loss indicates that Amelio is prepared to take real action, rather than paper over problems or stretch them out.

display

The Monitor
That Sees You

BUILT-IN AUDIO,
OPTIONAL CAMERA AIM
AT CONFERENCING

by Howard Baldwin

Face it, you've already got enough stuff messing up your desk. If you're investing in multimedia or videoconferencing, that usually means you'll need a whole new range of peripherals, plus additional space to house them. But not if you get one of the MediaStation 17-inch monitors from Nokia Display Products (415/331-4244), which integrate speakers, a subwoofer, a microphone, and optionally a color video camera, all in one box.

The 447Xav (shown below) incorporates a directional microphone (that tiny dot in the upper center of its bezel) and a subwoofer (those rectangular lines in its base). At \$999, the 447Xav costs about the same as most 17-



Nokia's 447Xav includes speakers and a mike.

inch monitors. For \$500 more, you get the 447K model, which adds a color video camera to the lower center section of the bezel. But with black-and-white cameras selling for \$100 to \$150, this may be more integration than you're willing to pay for.

You can adjust the camera up and down by 10 degrees (but not side to side); Nokia claims that positioning the camera at the bottom of the monitor rather than on top of it provides a more natural view of videoconference participants, who tend to look down at the monitor regardless of where the camera is located. Both monitors offer up to 1280-by-1024-pixel resolution (with the addition of a video card such as Radius's ThunderColor 30/1600 or Number Nine's Imagine 128) and were to be available early this month.

systems

RAM Prices' Sudden Drop

EVEN 16MB CHIPS ARE NOW AFFORDABLE

by Cary Lu

As desktop computer sales decline, with two large Taiwanese RAM-chip plants nearly complete, and with many production lines upgrading to higher-capacity memory chips, the price of RAM has suddenly taken a sharp dive. Subject to real or perceived changes in demand (resulting from such events as the introduction of Windows 95) and in production (a chemical-plant fire in 1993), dynamic RAM prices have been relatively stable since 1991, with demand outstripping supply by 10 to 20 percent for the past five years. That's now changed. (Of course, if demand goes back up, so will RAM prices.) And

graphics

CorelDraw Finally Comes to the Mac

BUT WILL IT

BE WORTH THE WAIT?

by J. D. Lasica

Do Adobe Illustrator and Macromedia FreeHand have a hammerlock on top-end draw programs for the Mac? Not in the view of Corel (613/728-8200), which is readying a Power Mac version of CorelDraw, the world's best-selling illustration package. The company introduced CorelDraw for the PC in

continues

Systems WATCH

BY CARY LU

Pruning Technologies at Apple

Something strange is going on at Apple: cost containment. The company that made a habit of blindly throwing cash at projects has spent the last nine months ridding itself of projects that were sucking up resources without producing results: eWorld, Dylan, Taligent, and Kaleida are among the publicly known ones. According to sources within and outside Apple, even core technology groups are being forced to make compromises. (Apple declined to comment.)

Cuts in Copland For Copland, Apple's next-generation operating system, such compromises take the shape of features that may be dropped. The Copland file system will be written in native PowerPC code, unlike System 7.5—but early reports say that users will not notice any significant speed improvement as a result of the new file-system code.

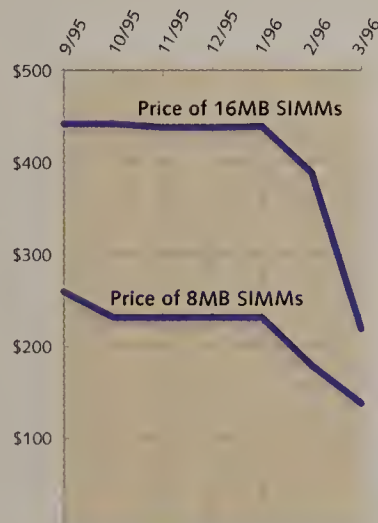
And Apple has killed a new disk-directory structure. Today's 2GB hard drives store small

files inefficiently because the minimum block size—the smallest storage unit—is 32K, even if the file is only 10 bytes long. The canceled feature would have added additional b-tree structures in the disk directory to support much smaller minimum block sizes on large drives. Apple also killed native support for the Windows NT file system.

Firewire Plans Apple has canceled the PowerSurge2's—the revised Mac 7200, 7500/7600, 8500, and 9500 versions that were to ship this fall with Firewire, the very fast serial connection also called 1394. (The first PowerSurge systems, which are due this spring, are faster versions of the current 7200, 7500, 8500, and 9500.)

Instead, Apple is concentrating on the PowerPC Platform (formerly known as CHRP) design for Mac systems. Firewire will be available on the PowerPC Platform-based Macs through an add-on PCI board.

Clarix Goes OpenDoc After a year of playing coy about its OpenDoc plans, Apple subsidiary Clarix has finally said it will support OpenDoc, Apple's new component architecture for software development and interaction. The company is working on a version of ClarixWorks that will act as an OpenDoc container, letting you place OpenDoc-created elements inside ClarixWorks. But it may take until the end of the year to see the new ClarixWorks in its final form.



Source: Chip Merchant, a national RAM supplier.

although the cost of specialty memory (such as that for PowerBooks) has eased somewhat, its decline hasn't kept pace with the lowered prices for dynamic RAM.

Special REPORT

Digital Cameras on the Move

BY CARY LU

The trickle of low-cost color digital cameras that began with the Apple QuickTake 100 camera in 1994 is turning into a flood, with a dozen new cameras planned for this year alone. The low-priced models have split into under-\$1000 and \$1000-to-\$2000 segments. Unless otherwise described

all capture standard-size images—640 by 480 pixels to about 750 by 500 pixels—in 24-bit color.

Options under \$1000 The under-\$1000 cameras all store captured images (typically about 30) in internal RAM; you move the photos to your computer through a serial cable. And most use a simple optical viewfinder, which makes it difficult for you to frame and focus close-up photos.

- Casio's (201/361-5400) new \$999 QV-30 camera offers half-resolution (480 by 240 pixels), wide-angle, and telephoto settings, and a 2.5-inch LCD display viewfinder that can show four or nine tiny images at a time.

- Epson America's (310/782-0770) no-frills PhotoPC will sell for about \$500.

- Yashica's (908/560-0060) \$799 DA-1 camera resurrects the 2-inch analog floppy—a medium used by early still-video cameras such as the Sony Mavica and Canon Xapshot. The DA-1 records and outputs NTSC analog video, but also includes a 640-by-480-pixel digitizer for a serial connection to a Mac. Yashica points to low media costs—50 images fit on a reusable \$10 disk—as a major advantage for the DA-1.

Middle Category Expands Most new models fall in the \$1000-to-\$2000 range; all have PC Card storage unless otherwise noted—a definite advantage over RAM-only models, since you can keep shooting if

you change cards. They all have a small color LCD display, either built-in or clipped on to the camera; if you leave the clip-on LCD behind to minimize weight and conserve power, you can use the built-in optical viewfinder, as long as you don't need exact framing.

- A standard-resolution version of Casio's QV-30, without PC Card storage, should arrive in the fall.

- The small Ricoh (702/352-1615) RDC-1, available now, offers the novel feature of brief full-motion capture (1 second with an 8MB card) with a 3× zoom lens and an optional clip-on LCD monitor.

- The even smaller Pentax (303/799-8000) EI-C90, due in the fall, also comes with a clip-on LCD screen but lacks a zoom lens and motion capture.

- Fuji's (914/789-8295) Fujix DS-220 camera has two lens settings—wide angle and telephoto—plus NTSC output for focusing.

- Samsung's (201/902-9342) SSC-410N, due in stores this



The palm-size JVC GR-DV1.



The Polaroid PDC-2000 captures top-notch images.

November, resembles Apple's QuickTake, but outclasses it with a 3× zoom lens and small camcorder-style color LCD viewfinder. It has both SCSI and NTSC video-out connectors.

- Sony's (201/930-7796) DKC-ID1, due by summer offers the most features for the serious photographer: 768-by-576-pixel capture, a choice of shutter- or aperture-priority exposure, and a 12× zoom lens. Like many digital cameras, it uses Sony's lithium-ion camcorder battery.

Serious Business Above the \$2000 mark, today's digital cameras move into the realm of serious business users.

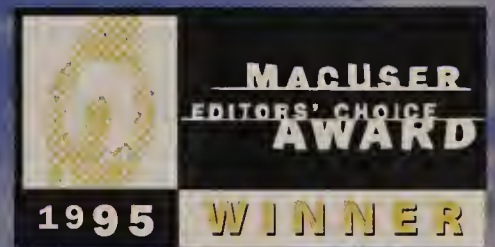
- At 1600 by 1200 pixels, the Polaroid (617/386-2000) PDC-2000 series produces a far better picture than its cheaper rivals. The \$2995 base model must be tethered to the Mac via a SCSI cable, since it can't store images. The other two models use PC Cards for storage: the \$3695 version can hold 40 images in its 40MB of internal storage, while the \$4995 version's 60MB can hold 60 images. The PDC-2000 doesn't compress images; to conserve RAM, all other companies'

cameras described here use compression (usually JPEG), which can cause image degradation. The lens has interchangeable elements for moderate wide-angle or telephoto shots.

Chasing After Analog All these models fall short of many traditional 35mm cameras, in both image quality and features. But the digital image is immediately accessible and suitable for many applications, including Web pages. As production increases, expect the two largest-costing items in a digital camera—the CCD sensor and the PC Card memory interface—to drop in price sharply over the next two years. By then, cameras equivalent to today's in quality will sell for about half the current price.

That's still not cheap enough to displace film for the mass photographic market, but it should make digital cameras a common rather than an exotic Mac accessory. And the digital camcorder (motion camera) will become a common appliance before the digital still cameras do; for example, JVC's tiny \$2999 GR-DV1 offers better image quality than traditional camcorders.

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Internet WATCH

BY CAMERON CROTTY

AT&T Hits the Web

A telecommunications giant has planted its broad foot in the online world. AT&T (800/423-4343) has announced its WorldNet Internet service, which comes with an AT&T-brand version of Netscape Navigator, although Mac Netters will have to wait until midyear to sign on (see "Bugs and Turkeys," *Consumer Advocate*, in this issue). The company is offering five free hours of access per month with no monthly fee to AT&T long-distance customers, with unlimited access for \$19.95 per month. AT&T also announced a nonexclusive alliance with America Online through which WorldNet members can sign up for AOL services at reduced rates. MCI (800/444-3333), which has had an Internet service plan since 1994, responded by adjusting its pricing structure, matching AT&T's \$19.95 monthly flat rate and offering five hours of access for \$9.95 per month.



Cross-Platform Chameleon

Standardization is the name of the game in corporate installations, especially in environments with multiple platforms. For network administrators looking to streamline their application stables, NetManage (408/973-7171, sales@netmanage.com) has released a full line of Mac products, including the \$295 Chameleon, the company's TCP/IP application suite. Chameleon includes the WebSurfer Web browser, PacerTerm terminal-emulation software, and an FTP client. NetManage has also released the \$250 WinSock SDK for the Mac OS; with it Mac developers can write client-server Internet applications using the WinSock API so popular on Windows.



HoTMetal Dives into Multimedia

Multimedia is the hottest ticket in Web town, and with the 3.0 release of HoTMetal Pro, SoftQuad shows that the company has an eye for the main stage. SoftQuad's (416/239-4801, sales@sq.com) HoTMetal Pro 3.0 supports audio and video, and page editors can drag and drop Java applets onto their Web documents and embed Java scripts. Version 3.0 comes with an editor for creating Netscape frames, and it supports Microsoft's ActiveX Controls. Web artists need not worry about being left in the technological dust, as they can download free updates, supporting new browser extensions and HTML tags, from <http://www.sq.com>.



PETER HOEY

1989. Now, about 3 million units later, it's finally ready to embrace the Mac market.

Rewritten for the Mac Product manager Haris Majeed says CorelDraw 6.0 for the Power Mac will not be merely a port of the Windows version, but a completely rewritten program that includes floating palettes, pop-up menus, and Mac-based controls.

The package, expected to ship in late June, will include CorelDraw 6; a photo-editing package; CorelTrace 6, for converting bitmaps to vector images; a visual-multimedia file manager; a font manager; a 3-D-modeling and ray-tracing program; and a texture-generation program. You'll also get 25,000 clip art images, 1000 fonts, 1000 photo images, and 750 3-D models.

Powerful and Intuitive While CorelDraw dominates the PC illustration market, Corel acknowledges it's taking on two formidable heavyweights in the Mac arena. It plans to woo Mac artists and designers with a suite of tools that Majeed calls "extremely powerful, easy to use, and much more intuitive than FreeHand or Illustrator."

Other promised attractions include full PostScript capabilities; support for Apple Guide, ColorSync, and QuickDraw GX; and the greater graphics precision that comes with a 32-bit application. It will also let you open a file directly, whether it was created on a Mac or PC.

It's unknown how stable the final product will be. For the last three Windows ver-

sions, Corel released new versions of CorelDraw that contained many bugs each time, requiring a bug-fix update several months later. And EPS files generated by CorelDraw have long caused trouble for service bureaus.

The company plans to price the package at or slightly below its \$695 Windows version. CorelDraw will require a Power Mac with System 7.5 and a minimum 8MB of RAM (16MB recommended).

input devices

Color Photos Made a Snap

GRAB STILL IMAGES OR QUICKTIME MOVIES WITH THE COLOR QUICKCAM

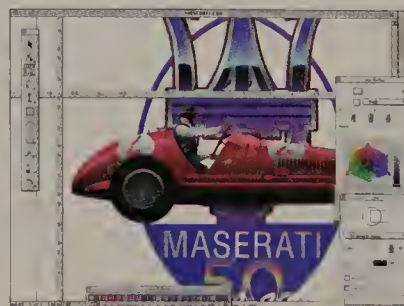
by Galen Gruman

Everyone's been waiting for the other shoe to drop, and now it has. Connectix (415/571-5100) has released a color version of its popular QuickCam digital camera.

What's particularly great about the \$239 Color QuickCam, based on my experience with a late prototype, is that it handles motion video pretty well—enough for simple QuickTime recordings for use on the Web.

The camera has built-in hardware compression that keeps the data rate to under 1.5 MBps (the maximum for the Mac's serial port) and handles 3 to 4 frames per second at 16-bit color for a 640-by-480-pixel image, and about 8 fps for a 320-by-240-pixel image. At the 160-by-120-pixel size, you get a rate of about 15 fps. In all cases, with default compression the image quality was fine.

Manual-focusing capabil-



The favorite illustration program on Windows is set to tackle the Mac.



The Color QuickCam takes decent-quality images even at half-screen resolution (320 by 240 pixels), although the frame rate suffers.

ity and an impressive set of software controls—including timed capture, so you can publish your coffeepot's status on the Web—round out the Color QuickCam's features. Connectix estimates the camera will sell for \$230.



Optical drives can now store as much as 4.6GB per disk.

storage

Optical Drives Expand Their Capacity

NEXT YEAR THEY'LL

DOUBLE AGAIN, TO 5.2GB

by Tim Warner

The newest wave of magneto-optical (MO) drives offer twice the capacity of 1.3GB MO drives and somewhat improved performance. That improved performance comes

from a change in how MO drives write to the disks: by writing to the outside edge first, as hard drives now do, the 2.6GB MO drive can access the data faster.

Companies such as Hitachi, MaxOptix, Most, Olympus, and Sony—and possibly NEC Technologies and Nikon—are planning to deliver 2.6GB drives by July. Prices will be high at first, between \$2300 and \$2600, but are expected to fall to about \$2000 in the fall.

Pinnacle Micro (714/789-3000), which announced its \$1695 Apex 4.6GB MO drive last August, is testing the market's acceptance of higher capacities. Pinnacle is still selling only a few drives because it has had difficulty getting hardware components and completing the software for the Apex—the first mechanism of the company's own design. The Apex drive is compatible with 1.3GB and 2.6GB media as well as with its own 4.6GB media.

Among the Apex's differences is that it is the first drive to claim direct-overwrite capability. The holy grail of MO technology, direct overwrite increases data-transfer speeds by eliminating the erase pass common in earlier MO drives. Pinnacle hopes the speed gain will

win MO drives the customer acceptance now afforded traditional hard drives.

Nikon holds the patent to one technology that makes direct overwrite possible, Light-Intensity Modulation Direct-Overwrite, or LIM-DOW. Pinnacle Micro is using a variant of this in the Apex; the company says it licensed this variant through Canon, which has a business relationship with Nikon. Nikon hopes the International Standards Organization, which sets technical standards throughout the world, will adopt Nikon's version of LIM-DOW for next

year's 5.2GB MO drives, which should be available from a range of companies.

Until direct overwrite boosts transfer speeds, digital video may be one area where 2.6GB-and-higher-capacity drives make a difference. According to a Sony spokesperson, a 2.6GB MO cartridge can hold 90 minutes of MPEG-2 video on each side, potentially making it ideal for transporting and archiving digital video. For MO's historic uses, such as medical image archiving and network storage, higher capacities provide convenience.

The Open Transport Advantage

ENJOY FASTER INTERNET ACCESS

Have a fast Internet connection? Here's a great reason to install System 7.5.3: Open Transport. No kidding—version 1.1 of Apple's networking software not only has shed the bugs that plagued its predecessors, but it's also dramatically faster than the MacTCP network protocol software that it replaces. In preliminary Macworld Lab tests, Netscape Navigator 2.0 was nearly twice as fast with Open Transport 1.1 as it was with MacTCP when downloading files from a remote Web site. On similar tests performed over an ISDN line, Open Transport 1.1 averaged 50 percent better performance than MacTCP.

Apple cites several reasons for the speed increase. Open Transport runs native on Power Macs; it recovers from dropped packets more efficiently than did MacTCP; and it uses larger, more efficient packet sizes with some connections. Apple says that Open Transport 1.1 can even boost 28.8-Kbps dial-up performance on 68040-or-faster Macs. But the biggest gains appear on lines that are ISDN speed or faster.—JIM HEID



Power Surfing with Open Transport

Open Transport 1.1	32.9
Classic MacTCP	60.3

We timed how long it took—using Netscape Navigator 2.0, a Power Mac 7100/80, and System 7.5.3—to download a 1166K file from a remote Internet server. We ran each test ten times, discarded the high and low trials, and averaged the remaining times (in seconds). Even given the widely varying and uncontrollable conditions of the Net, our test shows the dramatic speed improvement provided by Open Transport 1.1 compared with the Mac's classic networking engine.—Macworld Lab testing supervised by Matt Clark



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"NEW PLATFORM DESIGN"*continued from page 35*

ket will never be large enough to make the PPCP a critical industry standard, leaving Apple as the only large-volume supplier of PPCP-based computers.

Still, the eminently affordable Macintosh Licensing Design could help. Hartsook says that contrary to Potts's description, the new design is closer to the PPCP than it is to the current Mac hardware platform. "Given IBM's lack of support for a standard [PowerPC] desktop design, . . . this might become the de facto standard PowerPC Platform."

Clone Makers Progress

Meanwhile, a range of smaller developments have kept the clone market from falling asleep during the wait for the PPCP and the new Macintosh Licensing Platform.

Umax Set to Ship Umax Computer (510/226-6886, *info@supermac.com*) plans to ship its first product, the SuperMac S900, in May. The 150MHz, PowerPC 604-based machine (see *News*, May 1996, and the "Ultimate Imaging" special report elsewhere in this issue) will sell for \$4000 and should compete well on price and performance with the top of the Apple and Power Computing product lines. It features RAM expandability to 1GB, optional Ultra SCSI and 100-Mbps Ethernet, and an 8x CD-ROM drive, as well as a slot for adding a second CPU card.

First European Clones Olivetti Telemedia, the Italian technology conglomerate, recently signed a Mac OS license. And Acorn Group (of which Olivetti is the principal shareholder) and Apple Computer announced a joint venture to expand Mac sales in the United Kingdom's education market, where Acorn's proprietary hardware dominates.

The joint venture's computer products will be based on the PPCP. The UK effort represents the leading edge of a broader alliance between Olivetti and Apple to increase both companies' shares of the European education market.

Power Computing Diversifies Power Computing (512/388-6868, *info@powercc.com*), in which Olivetti also holds a substantial stake, plans to augment its current products with a low-end clone business. CEO Steven Kahng says that as Apple reduces its commitment to the consumer market, his company will step into the breach. Kahng also indicates that Power Computing will

build notebooks, but it has not yet decided whether these will be based on the current Mac design or on the PPCP.

The company also plans to introduce Mac clones in Japan.

Pitiable Pioneer In Japan, Pioneer's Mac clone has suffered from poor sales since its introduction last fall. Japanese software developers and *Macworld Japan* editors attribute the poor sales to a lack of commitment and marketing by Pioneer, the company's unfamiliarity with the computer market (one developer says, "This was clearly someone's pet project, not a corporate priority"), and bad timing—Pioneer's single clone system

shipped just as Apple significantly dropped prices, undercutting the Pioneer Mac.

The Mac That Isn't Also in Japan, Bandai Digital Electronics has begun shipping its Pippin Atmark system, a game player and Internet surfer that is a stripped-down Mac inside and uses a regular TV for display (see "Bandai's Pippin Arrives," *News*, May 1996). Priced at about \$650, the device is expensive compared with popular game players, and costs more than the \$500 figure tossed about by industry pundits as the target price for an Internet surfer. A U.S. version is expected to come out in summer or fall.

Triple the PowerPC Power?

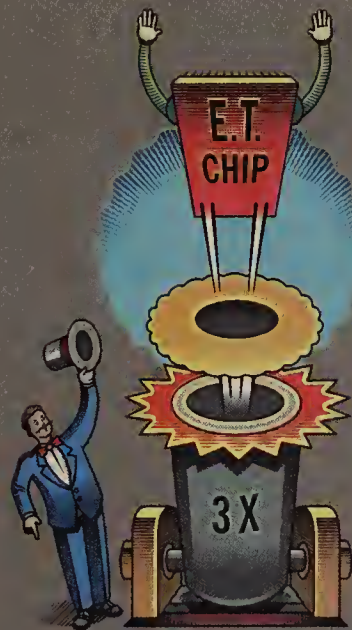
EXPONENTIAL'S AMBITIOUS PLANS FOR ITS POWERPC CLONE CPU

Apple isn't the only company in the Mac market that is licensing technology these days. A new chip design company, Exponential Technology, has purchased the right to make PowerPC-compatible CPUs from IBM and Motorola. The company says it can build chips that run at three times the speed of current PowerPC and Pentium chips, but a few stumbling blocks still remain.

Analysts following the microprocessor industry are skeptical of the company's plan to build the chip's logic circuits entirely with bipolar technology, rather than with the standard CMOS components. According to Linley Gwennap, editor of the respected *Microprocessor Report*, most chip manufacturers, including Intel, are moving away from bipolar design. "Bipolar has delivered higher clock speeds, but the chip will run hotter and is less dense, which means you can't get as much stuff on the chip," Gwennap says.

Exponential's president and CEO, Rick Shriner, a former Apple vice president, admits that the chip will run hotter and require a much bigger heat sink than do most chips; a bigger fan will also be necessary to keep the CPU cool.

However, Shriner feels that it's worth taking



the heat in exchange for the speed benefits, adding that current cases won't need to be redesigned to accommodate hotter chips. Exponential's chip will be about the size of a PowerPC 601 chip, and Shriner expects it to cost between \$800 and \$1200, roughly twice the price of current PowerPC 604 chips.

Apple Computer is Exponential's largest investor, having purchased between 15 percent and 20 percent of the company. Terry Bailey, vice president of Apple's Imaging Peripheral Systems division

and Apple's representative on the Exponential board, says that Apple "will be planning on using the [CPUs] in appropriate products when they're available. It depends on the price point." However, no deals had been signed at press time.

Exponential announced in February that its development plans were on schedule but that it had not yet tested the chip design with the Mac OS, a process scheduled for April; nor had it completed negotiations with its foreign fabrication facility, suggesting to Gwennap that skepticism is warranted. "I've heard a dozen companies over the years say they're going to build the fastest microprocessor, and none of them ever have," he says.—HOWARD BALDWIN

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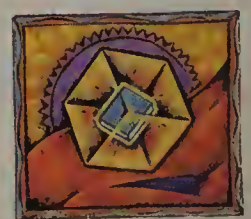
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New Products

THE LATEST MACINTOSH RELEASES

COMMUNICATIONS

If You Stay or If You Go

If you work on the road, you'll want to check out Smart Modular Technologies' (510/623-1231) \$307 Mobile Plus PC Card 28.8-Kbps fax modem. The Mobile Plus has jacks for both phone-line and cellular use, and supports TX-CEL and MNP 10EC wireless error correction.

At home, Diamond Multimedia's (408/325-7000) \$289 SupraSonic 288V+ 28.8-Kbps data/voice/fax modem could stand as a one-stop home office. The SupraSonic 288V+ comes with a headset and supports Caller ID.

Improved Fax Software

STF Technologies (816/463-7972, 74740.1244@compuserve.com) has upgraded its \$99 Faxstf fax software to version 3.2. Upgrades are free to registered users. Enhancements include broader modem compatibility, System 7.5.2 compatibility, and QuickDraw GX support.

DISPLAY

Large-Screen Monitors

Looking for a larger monitor? The latest choices include

- ViewSonic's (909/869-7976) Optique V775, an \$895, 17-inch monitor with a fine (0.26mm) aperture grille for sharp display. ViewSonic also offers the \$1065, 16-inch PT770 display.

- Techmedia Computer Systems' (714/379-6677) \$1499, 20-inch TCM-2050.

A Mac video adapter is required for both companies' monitors.

Projecting Ideas

LCD is still the undefeated champion technology of color projection dis-

play. nView's (804/873-1354) \$5995 Z255 panel uses a 10.4-inch color active matrix display. Sharp (201/529-8731) has introduced a similar panel, the \$6295 QA-1800; both the nView and the Sharp panels accept NTSC and PAL video input.

For larger, sharper images, Sharp's \$9995 QA-2500 offers 1024-by-768-pixel resolution. If you need an all-in-one projector, Sharp also offers the \$4995 XG-E630U, a 16-million-color projector capable of producing a 300-lumen image, and the \$9995 XG-E1000U, which doubles its sibling's brightness to 600 lumens.

InFocus Systems (503/685-8888) has introduced the LitePro 210 multimedia projector and the PowerView 820 projection panel. Weighing under 5 pounds, the LitePro has built-in JBL speakers and an active matrix screen that projects images at a resolution up to 800 by 600 pixels. Prices start at \$5499. The PowerView data-only module is \$4499; the multimedia system with data and video support is \$4999. Both the LitePro and the PowerView have simplified connections to the computer, audio, mouse, and monitor.



LitePro 210 and PowerView 820

Put Your Mac on TV

Need a larger screen for your presentation? How about plugging into a TV? Maxmedia TV Pro II from Umax (510/651-4000) is a \$400 remote-controlled external scan converter that transfers any computer image to a large-screen TV or a VCR for video publishing.

Focus Enhancements' (708/291-1616) Focus PCZTV card can transfer computer images to any TV that uses Zenith's SuperPort technology (for linking commercial TV sets to portable computers).



Umax's Maxmedia TV Pro II

ENTERTAINMENT

Game On

In springtime a gamer's fancy turns to thoughts of mayhem, and there's plenty out there for the Mac in 1996. In New World Computing's (818/889-5600) \$50 Chaos Overlords strategy game, you must balance your resources in a fight for control of a futuristic city run by armed gangs. The twitchy-fingered sequel-hungry will enjoy the \$20 Diamonds II from Varcon (800/266-2700), an update of the award-winning Diamonds paddle-ball-and-brick game, or the \$20 Cyclone II, High Risk Ventures' (highrisk@aol.com) clone of the old Star Castle arcade game with a few new twists.

GT Interactive (212/726-6500) is publishing Id Software's blockbuster Doom titles. The \$35 Ultimate Doom is now available, bearing the original three episodes and a new fourth, titled Thy Flesh Consumed. By the time you read this, Raven Software's fantasy/role-playing game adaptation of the Doom engine, Hexen, should be available. Hexen is more exploration- and puzzle-oriented, but you'll still have to wield ax, mace, and magic to survive hordes of monsters as a fighter, cleric, or mage.

GRAPHICS

One-Step Scanning

Umax (510/651-4000) is making scanning easier than ever with the Vista-S12, a 24-bit 600-dpi single-

pass color flatbed that uses analog gamma correction to capture the equivalent of a 33-bit image, providing maximum highlight and shadow details. It automatically handles functions such as background cropping, deskewing, and color and autodensity adjustments. For \$895, you get Adobe Photoshop LE, OCR software, and Corel Professional Photos CD. The \$995 bundle includes the full version of Photoshop, Kai's Power Tools (SE), KPT Power Photos, and Pixar's Typestry. The optional document feeder and transparency adapter are each \$495.

Photoshop Autopilot

Photoshop is powerful, but some operations take a lot of time. Global Software Development (817/838-8192) offers Photobot to help out. The \$80 program automates several Photoshop operations, including filtering, format changes, and rotations.

Get Into 3-D

If you've been contemplating a leap into 3-D, now may be the time.

Byte by Byte (512/305-0360) has just slashed the price of its 3-D modeling, rendering, and animation package, Sculpt 3D 4.1, by a cool grand. For \$495, you get extensive modeling tools; fast, high-quality ray tracing; and a camera-path-based interface for creating QuickTime movies. Try out the free Sculpt 3D demo CD-ROM before you buy.

Now, thanks to Strata (801/628-5218), QuarkXPress users can create 3-D layout elements with 3d XT, a \$99 QuarkXTension that provides editable surfaces and solid textures, customizable backgrounds and object libraries, light sources and gels, and rotation of 3-D objects.

Photos and Art to Go

Need some creative stimulation? There's no shortage of royalty-free photograph backgrounds, textures, and illustrations to add to your toolbox.

Terra Firma is a \$100 CD from Texture Farm (415/284-6180) containing 108 landscape photo-illustrations.

P

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The Zone
Multiple Zones International, Inc.

EGGHEAD SOFTWARE
North America's Software Eggheads

PC Connection

COMPUSA

COMPUTER
SWAN
SUPERSTORE

MICRO CENTER
THE COMPUTER DEPARTMENT STORE

NECX

Circle 100 on reader service card

New Products

trations jointly created by photographer David Wasserman and digital artist Fred Smith.

A five-volume CD-ROM collection of illustrations by Seymour Chwast is now available through FontHaus (203/367-1993, fonthaus@aol.com). Each volume is \$149 and the entire collection is \$599 through May; after that, each volume is \$179 and the collection is \$729.

Classic PIO Partners (818/564-8106) has released its \$99 Classic Fabrics Collection (volume 1) on two CDs, which include 40 fabric pattern prints from the 1930s, '40s, and '50s.

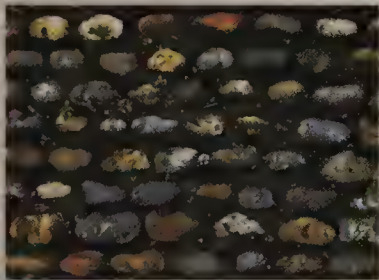


Image Farm's Streets of London

Image Farm (416/504-4161, image-info@imagefarm.com) has five 100-image collections on CD (\$99 each): Arizona Desert, Real Rock, Berlin Walls, Streets of London, and Cottage and Country.

MULTIMEDIA

Better Audio

If you need good sound quality but have limited space, check out Labtec's (360/896-2000) Space-Saver speaker systems, all featuring 10-watt RMS output at 1 percent distortion and frequency response of 70Hz to 20,000Hz. Street prices for the three models range from \$70 to \$90.

NETWORKING

To Serve Mankind

Seems you always need just one more utility to aim the silver bullet of your network at the hairy werewolf of inefficiency. Here are two.

Version 2.5 (\$495 for ten-user

Starter Pak) of FileWave, the automated software-distribution and -management package from Wave Research (510/704-3900), comes with templates for popular software packages to make installation easier. Administrators can now also closely inspect users' machines, including the directories of all attached volumes.

Power On Software (612/879-9190) has just announced its own software-distribution and -control package: Net Commander (\$70 per machine, with quantity discounts available). Net Commander does not require a dedicated server, and can simultaneously broadcast administrator commands to multiple Macintoshes.

Card-Size Ethernet

Sonic Systems (408/736-1900) and Asanté (408/435-8388) have both released Type II PC Card Ethernet adapters. The \$169 Sonic ConnectCard TwP works with 10BaseT, while the \$199 ConnectCard TnT works with 10Base2. Asanté's 10BaseT FriendlyNet card carries a street price of \$157, while a combination 10BaseT-and-10Base2 card sells for \$191. Asanté has also released the MacConCS Ethernet card for the Mac Comm slot found in the Performas and Macintosh LCs (the 10BaseT version costs \$73; 10Base2 costs \$83).

PRINTING

Print Like the Wind

If you're locked inside while spring is busy exploding outside, here are a few new office printers to bombard with print jobs. Hey, vent your frustrations where you can.

- Xerox's (716/425-5230) \$2850 4517mp is a 17-ppm, 600-dpi monochrome laser printer with Adobe PostScript Level 2 support and an Ethernet connection.

- If black and white leaves you feeling like an old movie, try the \$995



Epson's Color Stylus 1500

Color Stylus 1500. Epson America's (310/782-0770) newest ink-jet prints 720 by 720 dpi on media up to 13.6 by 21.78 inches.

- Don't forget Xanté's (334/476-8189) 8-ppm Adobe PostScript Level 2 Accel-a-Writer 8300, available in a 600-dpi (\$3495) version and a 1200-dpi (\$5495) version.

PUBLISHING

Publishing across Platforms

If you need to do cross-platform authoring and publishing for delivery in a variety of media, FrameMaker+SGML, from Adobe Systems (415/961-4400), is designed for you. Retailing on the Mac for \$1495, FrameMaker+SGML provides page composition, text editing, graphics, interactive-structure validation, and visual support in an intuitive interface. And its application-programming interface lets developers customize the program.

Beef Up Your Font Library

You can never have too many fonts, and several companies are ready to tempt you with more.

Get the look of handwritten text with Adobe's (415/961-4400) \$39 Script Teaser package of ten script typefaces. Other new Adobe typefaces include Adobe Jenson (\$145), Jenson Expert Collection (\$105), Bulmer (\$275), Bulmer Expert Collection (\$105), Eccentric (\$105), and Ocean Sans (\$145). Each package is available for half the retail price through June.

ClickArt Handwritten Fonts from T/Maker (415/962-0195, clickart_info@tmaker.com) is a \$40 collection of 300 TrueType fonts derived from original handwriting samples.

STORAGE

High-Capacity Backup

MicroNet Technology (714/453-6000) is shipping the \$7645 SB40DLT, a digital linear tape system that offers up to 40GB per cartridge.

Meanwhile, Spectra Logic (303/449-7759, library@spectra.wali.com) has entered the Mac market by getting Dantz Development (510/253-3000, info@dantz.com) to add support in Retrospect 3.0 for the Spectra 4000 tape-library drives, which support up to 60 tapes per drive system.

SYSTEMS

New Macs for Classrooms

Apple (408/996-1010) has introduced two new Power Macs for schools: the \$2299, 5400/120 desktop system and the \$1999, 5260/100 all-in-one system. Both use PowerPC 603e CPUs and have 16MB of RAM, a monitor, a 4x CD-ROM drive, a keyboard, and a mouse. The 5400/120 also includes one PCI slot and a 1.6GB hard drive. The 5260/100 includes one LC III-style PDS and an 800MB hard drive. These systems are sold only to schools.

MessagePad Gets Brighter

Now that the Newton OS works well, Apple (408/996-1010) is enhancing Newton hardware. The new MessagePad 130 features controllable backlighting and a nonglare screen. The \$799 PDA comes standard with 8MB of ROM, 2.5MB of RAM, and 512K of additional memory.

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Reviews

Jaz Drive

IOMEGA THINKS BIG WITH
ZIP'S NEW SIBLING

A PERENNIAL ALSO-RAN in the removable-media market, Iomega reversed its fortunes last year with the wildly popular Zip drive (see *Reviews*, July 1995). More than 1 million units of the diminutive cobalt-blue drive had been sold as of mid-March 1996. For months, Zip drives were in high demand and short supply, and only recently have you been able to walk into a local superstore and buy a Zip without waiting weeks for it.

With a capacity of around 94MB on a formatted disk, the Zip just wasn't big enough or fast enough to fill the needs of space-hungry graphics users. Sensing a void, Iomega quickly developed a new high-capacity, high-speed drive code-named Viper.

Announced in June 1995, Iomega's new creation—called the Jaz drive—promised true hard drive speeds and a capacity greater than 1GB, at a cost far lower than that of standard storage media. In short, the Jaz promised to be a bigger, faster Zip drive.

A Family Resemblance

At first glance, the Jaz drive resembles a dark-green mutation of the Zip, but a peek at the Jaz disks—and the rear of the unit—illustrates the key differences between the Jaz and its low-cost, low-capacity sibling. Where the designers of the consumer-oriented Zip kept the price



down by eliminating such “frills” as a standard SCSI selector and a power button, in the Jaz they give you the option of all seven SCSI ID numbers and an on/off toggle switch. Like the Zip, the Jaz offers a termination switch (eliminating the need for an external SCSI terminator), but where the Zip's termination can only be set to on or off, the Jaz also offers an automatic setting that senses its position in the SCSI chain and configures the drive accordingly.

The Jaz comes equipped with dual 50-pin Fast SCSI-2 connectors to connect easily to Macs with built-in SCSI-2 connectors or a third-party SCSI accel-

erator card. But one person's feature is another's flaw: if the devices on your SCSI chain have standard 50-pin SCSI jacks, you need an adapter plug or special cables to hook them up. Iomega supplies just one cable and an adapter to attach the Jaz drive to your Mac's 25-pin SCSI connector.

The Jaz drive weighs close to two pounds, about twice as much as a Zip drive despite their similar size; the difference is owing to Jaz's internal power supply. Like Zip disks, the 3½-inch Jaz cartridges come in two sizes: a low-cost 540MB variety for \$69, and the 1GB economy size for \$125 (as low as \$99 in

RATINGS

Outstanding ★★★★★ = 9.0–10.0

Very Good ★★★★ = 7.0–8.9

Good ★★★ = 5.0–6.9

Flawed ★★ = 3.0–4.9

Unacceptable ★ = 0–2.9

quantity). The cartridges themselves resemble the similarly sized SyQuest and Zip media, although the front edge is curved rather than squared off.

The media differences aren't just cosmetic. Jaz disks are based on traditional hard drive technology with two rigid platters, while Zip disks are floppy-based media. As such, Jaz disks are more fragile than Zip or Bernoulli media: don't expect to play catch with these cartridges and maintain your data's integrity.

As Fast as a Hard Drive

Macworld Lab tested the Jaz both with and without a SCSI-2 accelerator card. True to Iomega's word, the Jaz drive's performance was comparable to fixed 1GB and 2GB mechanisms' in most tasks, and was considerably faster than a 1.3GB magneto-optical (MO) drive's.

Test results varied depending on tasks. File duplication at the Finder level was the Jaz's weak suit, where the standard hard drive completed tests 17 percent faster than the Jaz, even when the Jaz was connected to a SCSI-2 accelerator card. Copying files was another story: performance was as good as or better than hard drive speeds, copying both to and from the Jaz. Photoshop file speeds were even more impressive. Equipped with a SCSI-2 accelerator card, the Jaz was easily 10 percent faster than the standard hard drive, and three times faster than the MO. Even attached to the standard Mac SCSI connection, the Jaz edged past the hard drive by a slim margin.

No Video Star

Iomega claims that the Jaz consistently achieves sustained transfer rates of 5.5MB per second—adequate for use in

broadcast-quality video. Although we successfully captured full-frame video to our Jaz drive, we achieved data-transfer rates just a tad over 3 MBps and therefore couldn't capture video at the maximum frame rate. If you've set your sights on the Jaz as a storage medium for professional multimedia, you'll want to turn to one of the OEMs—such as MicroNet or ProMax—who claim that their Jaz arrays provide data-transfer rates fast enough for professional-quality video. Unfortunately, Iomega's off-the-shelf drive isn't really suitable for high-end video capture.

The Right Tools for the Job

The Jaz Tools disk comes full of utilities to help manage your data. The main program lets you format and write-protect disks, engage a write-verify function to enhance the integrity of your data transfers, and configure the Jaz's sleep mode to power down the drive after a selected period of inactivity. The only software goodie the Jaz lacks is a tool to partition your disks. Iomega says that third-party programs should work, but may need updates to provide the best performance.

Dantz DiskFit is included for backup chores. Other tools include FindIt, a disk-cataloging utility; and Iomega Guest, which lets you mount Jaz media on your desktop without requiring you to install a system extension.

Though plans weren't finalized at press time, Iomega will offer a Fast SCSI-2 PCI card, using a single model for both Macs and PCs. With an expected street price of \$99, the card—dubbed the JazJet—should be a bargain if its performance is on par with that of competing products.

The Battle Ahead

With Iomega's Jaz drive finally out the door, the folks at SyQuest aren't sitting still. It's no secret that they're also working on a high-capacity removable drive, called the SyJet. At last report, SyQuest planned to ship SyJet early this summer, but that product announcement has done little so far to dampen the hype surrounding the Jaz.

The head-to-head battle between the SyJet and the Jaz could be a replay of the competition between the Zip drive and SyQuest's EZ135 (see *Reviews*, December 1995). Although SyQuest's product was faster and offered greater capacity, Zip's early entry to the marketplace, convenient floppy-based media, and trendy consumer appeal put Iomega on top by a wide margin. The stakes are higher in the 1GB arena, and time will tell whether SyQuest has learned any lessons from the previous skirmish.

The Last Word

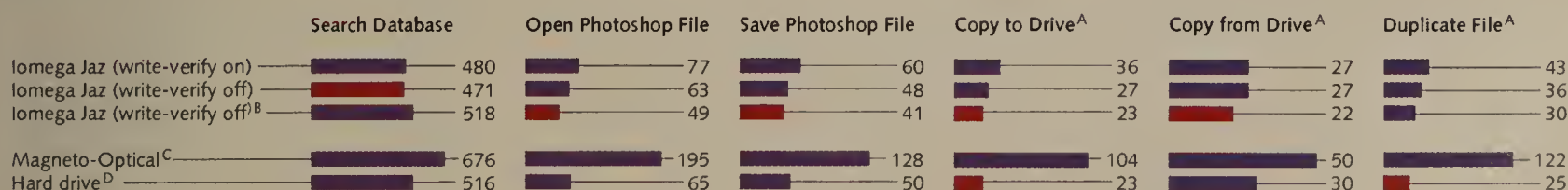
If you need portability and an inexpensive way to gain capacity, the Jaz drive takes top honors for now, especially if you aren't concerned with professional-level video production. But if SyQuest's SyJet drive makes it past the starting gate anytime soon, the Jaz drive may have some heavy competition.—GENE STEINBERG

RATING: ★★★★★/8.3 **PROS:** Applications performance matches or exceeds that of fixed drives; high capacity; easy setup. **CONS:** Not suitable for broadcast-quality video capture; disk formatter cannot partition media. **COMPANY:** Iomega (801/778-1000). **COMPANY'S ESTIMATED PRICE:** \$599.95.



Jaz: Iomega Strikes Again

■ Best result in test. Times are in seconds. Shorter bars are better.



^AUsing the Finder. ^BUsing Fast SCSI-2 card. ^CMaxoptix TMT3-1300. ^DMicropolis 4421-07.

BEHIND OUR TESTS

All tests were performed on a Macintosh 7500/100 running System 7.5.2, equipped with 32MB of RAM and an Apple 17-inch multisynchronous monitor. Drives were connected to the external SCSI bus, and tested with write-verification disabled, unless otherwise noted.

Because Iomega's PCI card hadn't been finalized in time for our tests,

we performed our Fast SCSI-2 benchmarks using an FW8 PCI SCSI JackHammer accelerator card. For more information about our tests, see "Gigabyte Hard Drives" (*Buyers' Tools*), in this issue.—Macworld Lab testing supervised by Jeff Sacilotto

Xdream 1.0, XPert Tools 1.0

QUARK XTENSIONS RANGE FROM USEFUL TO INDISPENSABLE

JUST WHEN YOU THOUGHT THE lineup of XTensions—additions and enhancements to QuarkXPress—was complete, two new collections arrive to tempt you with features you didn't even know you needed. Both XPert Tools and Xdream are affordable and offer dozens of goodies to complement XPress's tool set, but XPert Tools' sophisticated features and polished interface give it an edge over Xdream for about the same price.

XPert Tools

Developed by A Lowly Apprentice Production and sold by XChange, XPert Tools is a powerful collection of 29 XTensions. Sold separately or bundled, XPert Tools' two volumes are a mixed bag—some are one-trick ponies with limited usefulness, while others add features you'll quickly find you can't live without.

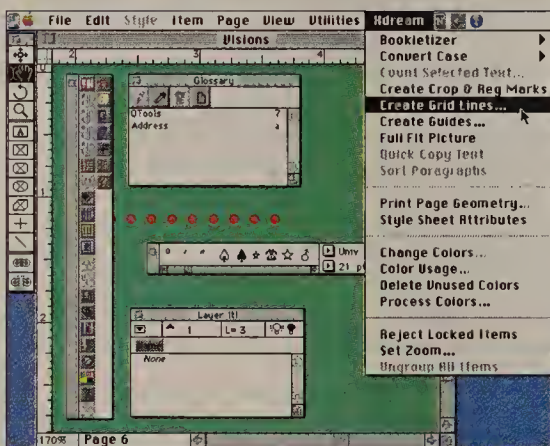
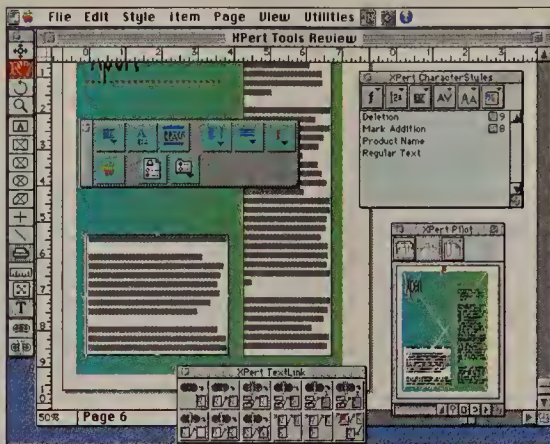
A good example is Volume 1's XPert Paste, a simple but powerful tool for pasting objects in exactly the same location from one page to another. You can even specify a range of pages on which you want an item copied—XPert Paste places the item in the same place on each of the designated pages automatically.

Another powerful XTension in Volume 1 is XPert Scale. While QuarkXPress can only scale individual items, XPert Scale lets you apply a proportional scale to multiple objects. You can also scale items by percentage or to a specific dimension. And the XPert Layers palette, although it's a bit confusing to work with, lets you group objects into layers that can be hidden, shuffled, and deleted.

One of the highlights of Volume 2, the stronger of the XPert Tools packages, is XPert CharacterStyles. Not only does it let you create character-level style sheets (one of the features most frequently requested by XPress users), but it lets you assign a keyboard shortcut to each style. Another is XPert TextLink, which gives you dazzling control over XPress text boxes; for example, you can unlink a series of text boxes while allowing each to retain its contents. While the TextLink palette is somewhat confusing—its buttons look so similar it's almost impossible

to tell them apart—it's powerful enough to make up for the weak interface.

In addition to a slick tool palette that you can customize to include buttons for XPress commands and functions, Volume 2 features tools that let you navi-



Tooling Up XPert Tools adds several tool bars and palettes to QuarkXPress (top); you access most of Xdream's features from a separate menu that appears in the menu bar (bottom).

gate a document by clicking on thumbnails, play back AppleScripts from within XPress, keep a log of document activities, and change picture boxes to text boxes and vice versa.

Xdream

Where XPert Tools is a collection of 29 XTensions, Xdream, from Vision's Edge, is a single XTension comprising 24 tools. This one-piece design makes installation easy, but it also makes Xdream an all-or-nothing affair: even if you like only a few of the components, you still have to live with all 24 of them.

The Xdream tools are useful if not inspiring. One adds a much-needed word-count function; another boosts

XPress's zoom capabilities from 400 to 1200 percent. Other Xdream tools add useful features but are poorly implemented. For example, the Create Grid Lines command is useful for setting up grids, but the setup dialog box is nonintuitive. Once you've created a grid, you can't edit it; once you define a grid configuration, you can't save it.

Another example of quirky implementation is the Glossary, a palette that lets you store frequently used chunks of text and insert them into documents. You insert glossary entries using one of the strangest key combinations you'll ever see—you hold down control-shift-option-G while pressing any other key—and the Glossary palette must be open for the shortcut to work.

Even some of Xdream's better tools suffer from design flaws. One gives you a thumbnail view of each page for quick navigation, but its palette is too small and can't be resized. The same is true of the DreamPad, a floating palette of Xdream commands: its buttons are minuscule and cryptic, you can't resize the palette or change its orientation, and you can't reorder the buttons.

The Last Word

At only \$20 less than the XPert Tools bundle, Xdream feels rough and short on features in comparison. If you need to go beyond QuarkXPress's feature set, XPert Tools will take you there.—JOSEPH SCHORR

Xdream 1.0

RATING: ★★ ★/5.1 **PROS:** Creates style-sheet reports; adds a glossary feature; easy installation. **CONS:** Poorly designed palette and tools, all 24 tools install as a single XTension; quirky interface and keyboard shortcuts. **COMPANY:** Vision's Edge (904/386-4573, info@xtender.com). **LIST PRICE:** \$149.

XPert Tools 1.0

RATING: ★★ ★★/7.1 **PROS:** Adds superb scaling and text linking; lets you create character-level style sheets; you can turn off XTensions you don't use; excellent value. **CONS:** Icons on tool bars and palettes can be confusing. **COMPANY:** XChange (970/229-0620, xchange@slip.net). **LIST PRICE:** Two volumes; \$99 per volume, \$169 for both.

Color Laser Printers

TEKTRONIX BEATS HP ON SPEED, RESOLUTION, AND PRICE

HEWLETT-PACKARD AND TEKtronix, two titans of printing, have recently released their second wave of color laser printers. A key player in thermal-wax and dye-sublimation color printing, Tektronix maintains a clear advantage with its Phaser 550, surpassing HP's Color LaserJet 5M with superior print quality, greater speed, and a significantly lower price.

In the Eye of the Beholder

Ignoring the 600-dpi standard for business-class products, the Color LaserJet 5M is a 300-dpi printer, and relies on HP's Resolution Enhancement technology for smooth text and line art. With monochrome images the gamble pays off: the Color LaserJet's text pages were indistinguishable from those of 600-dpi monochrome printers. With a base resolution of 600 dpi, the Tektronix Phaser 550's text was equally impressive.

When printing photographic and color business graphics, the Phaser was the clear winner, providing better saturation, smoother gradients, and a more faithful reproduction of the source files than the Color LaserJet's, although the Phaser's pages showed the slightly glossy finish typical of some color lasers.

With an engine speed of 14 pages per minute in black-and-white mode and 3.5 ppm for four-color documents, the Phaser 550 is dramatically faster than the 2-ppm color, 10-ppm monochrome Color LaserJet 5M, delivering graphics-oriented documents anywhere from 8



CESAR RUBIO

to 480 percent faster in our benchmark tests. The HP outperformed the Phaser when imaging an Adobe PageMaker document, but *only* when using Apple's LaserWriter 8.3 driver—the Color LaserJet 5M couldn't successfully image the page using HP's driver.

Nuts and Bolts

Both machines offer PostScript Level 2. The HP has built-in LocalTalk and Ethernet ports, which the Tektronix printer lacks, though either one is available for \$595 extra. The Phaser has a SCSI-2 port for attaching external hard disks or its CopyStation peripheral, a \$1695 option that turns the Phaser into a color copier by attaching a 300-dpi flatbed scanner. You can also boost the Phaser's resolution to 1200 dpi with a \$795 Extended Features option.

The Phaser also incorporates an internal HTML document—a Web page that you can use to view status or to change print options over a LAN using a standard Web browser; no additional

printer utility is required. When the Phaser is hooked to the Internet, links on this page can take you to the Tektronix Web site to view printing tips or download the latest driver version.

The Phaser's initial setup is simpler than the Color LaserJet's, and toner replacement is literally a snap: prefilled cartridges click into place. In contrast, HP's consumables are far from foolproof. If you don't properly dock the finicky plastic toner bottles in the filling station, a spill is bound to happen.

If you plan to print on a wide variety of media, the Color LaserJet 5M loses again: you can't feed envelopes or label stock through the HP engine.

The Last Word

If you're looking for top print quality at the fastest speeds we've seen yet in color lasers, the Phaser 550 is a clear winner. For basic graphics and high-quality text and line art, the Color LaserJet 5M is adequate, but its dramatically higher price outweighs its merits.—BILL UNDERWOOD

HP Color LaserJet 5M

RATING: ★★ ★/5.1 **PROS:** Excellent text output. **CONS:** Expensive; low resolution; slow. **COMPANY:** Hewlett-Packard (800/752-0900). **LIST PRICE:** \$9195.

Tektronix Phaser 550

RATING: ★★ ★★/7.9 **PROS:** Speedy; excellent image quality. **CONS:** Glossy finish; no built-in LocalTalk or Ethernet. **COMPANY:** Tektronix (503/682-7377, support@colorprinters.tek.com). **LIST PRICE:** \$6995.



Tektronix Phaser 550: Fast, High-Resolution Output

Despite its lower resolution, HP's Color LaserJet 5M fell behind the Tektronix Phaser 550 in most tests, dramatically so in key Illustrator and Photoshop trials. The HP fared better with pages composed predominantly of black text, though not by a great

margin. For more detailed information on Macworld Lab's tests, see "Color Printers Mean Business" (September 1995).—Macworld Lab testing supervised by Mark Hurlow

■ Best result for each test.
Times are in seconds.
Shorter bars are better.

	PostScript Print time for a 700K Adobe Illustrator file.	Bitmap Print time for a 12MB Photoshop 3.01 document.	Publishing Print time for a 3MB PageMaker 5.0 document.	Memo Print time for a 2-page Word 6.0 document with colored type and graphics.	Report Print time for a 20-page Word 6.0 document with all-black text.
Tektronix Phaser 550 at 600 dpi	127	269 ^A	188	90	198
HP Color LaserJet 5M at 300 dpi	613	433	160 ^B	98	156
Tektronix Phaser 550 at 1200 dpi	447	461 ^C	365	167	415

^A 191 seconds with Tektronix Photoshop export module. ^B Couldn't complete task with HP Color LaserJet 5M driver. Test performed with LaserWriter 8.3 driver with Color LaserJet 5M PPD. ^C 398 seconds with Tektronix Photoshop export module.

Audio-Production Programs

SOLID UPGRADES OF TWO MEDIA MAINSTAYS

MACROMEDIA IS MAKING A LOT of noise in the Macintosh audio scene. It recently shipped version 2.5 of Deck II, a multitrack recording program, and version 2.0 of SoundEdit 16, the Mac market's most popular sound-editing program. And now you can buy both products for a bargain \$499 list price.

Sweet SoundEdit 16

SoundEdit 16 2.0 better addresses the needs of multimedia producers by providing improved downsampling and dithering options—essential for getting good sound on CD-ROMs and the Web. Pros will also appreciate a batch mode that processes a flock of files in sequence.

The new version adds read-write support for AU files (a popular Web-site audio format) and for IMA compression (supported by Apple's QuickTime 2.1 and later). It also can import tracks from audio compact discs.

Macromedia fixed a glaring flaw in SoundEdit 16 1.0: the lack of recording-level adjustments. A new Levels window provides LED-style volume meters and lets you set record and playback levels. SoundEdit 16's user interface now more closely resembles those of its Macromedia siblings—with menu commands and tool bars similar to Director 5's.

More significant, version 2.0 lets you add third-party plug-ins (called Xtras) such as processing and effects filters, as well as file-import and -export modules; InVision Interactive (<http://www.cybersound.com>) offers its CyberSound FX family of effects in SoundEdit 16 Xtra format. Waves (<http://www.usit.net/waves/>) has released an Xtra that enables SoundEdit 16 to use the company's superb sound-enhancement tools.

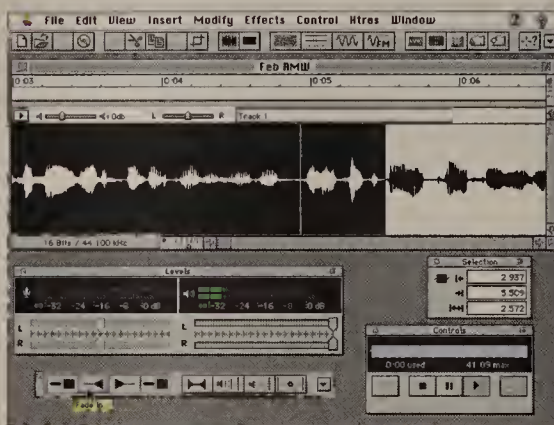
Unfortunately, SoundEdit 16 2.0 lacks scrubbing, a feature that lets you play a sound back and forth by moving the mouse. It's essential for editing voice tracks, and its absence in SoundEdit 16 2.0 is one reason I use Digidesign's Sound Designer II for heavy editing sessions.

Another annoyance: every time you save a file, SoundEdit 16 2.0 scrolls the file's window to the beginning, so you lose

your place—a real pain when editing large files. Saves are also slow.

Hit the Deck, Too

Deck II has always been the premier Mac multitrack recording program, providing features that used to require expensive audio hardware. More features, better performance, and some user-interface improvements in version 2.5 make a good thing even better. It's also the first Deck II version that runs on PCI Power Macs and the first that's not copy-protected.



The Latest Sounds Editing workhorse SoundEdit 16 2.0 (top) sports tool bars and support for plug-ins, called Xtras. Multitrack marvel Deck II 2.5 (bottom) provides real-time, nondestructive effects (accessible in the Mixer window, below each track number).

Deck II 2.5 adds support for Adobe Premiere-format audio filters such as those from InVision Interactive and Wave. It's too bad Deck II and SoundEdit 16 don't share a plug-in format.

On Power Macs, Deck II now provides up to four real-time, nondestructive effects (ones you can apply without altering an original recording). You can choose from several types of equalization as well as chorus, delay, and gain.

Deck II 2.5 boosts up to 32 the number of simultaneous tracks you can work with, although you'll need a fast disk array and a 604-based Power Mac to reach these heights. Version 2.5 is also speedier on Power Macs than earlier versions.

Deck II can now import tracks from audio CDs, and you can specify any sample rate when exporting files. Version 2.2 could export at only a few common rates.

Deck II 2.5 received a minor interface lift—the sliders are flashier and the program's automation features are less arcane. However, although Deck II 2.5 is the better program, its closest competitor, Digidesign's Session Software, still has the edge when it comes to ease of use.

Also, unlike Session Software, Deck II 2.5 doesn't let you group faders—for example, to adjust the volume of two tracks simultaneously. To automate a volume adjustment, you have to create the adjustment for one track and then apply the automation data to the other track.

The Last Word

SoundEdit 16 2.0 is a professional-level editor, but it needs a scrubbing feature and a tweaked Save command. Though it doesn't support fader grouping, Deck II has widened its lead over other software-only multitrack programs.—JIM HEID

Deck II 2.5

RATING: ★★★★★/7.1 **PROS:** Supports Premiere-format sound plug-ins; nondestructive, real-time effects (Power Macs only); increased track counts. **CONS:** No fader grouping; some user-interface quirks. **COMPANY:** Macromedia (415/252-2000, sales@macromedia.com). **LIST PRICE:** \$399.

SoundEdit 16 2.0

RATING: ★★★★★/7.0 **PROS:** Supports processing plug-ins and Web file formats; level controls. **CONS:** No scrubbing; scrolls window to beginning of file when you save; slow saves. **COMPANY:** Macromedia (415/252-2000, sales@macromedia.com). **LIST PRICE:** \$399.

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OmniPage Pro 6.0, TextBridge Pro 3.0

OCR SOFTWARE GETS MORE ACCURATE BUT LEAVES ROOM FOR IMPROVEMENT

PEOPLE HAVE BEEN TOYING WITH optical character recognition (OCR) for almost as long as they've been buying scanners. And for just as long, they've been complaining that OCR hasn't lived up to its promise as a business tool. Now, with lower prices enticing more and more Macintosh users to buy scanners, it's no surprise that both Xerox and Caere have updated their OCR packages.

Besides being more accurate than previous versions, bundled or otherwise, Caere's OmniPage Pro 6.0 and Xerox's TextBridge Pro 3.0 have some new features: OmniPage is now accessible from any program, and TextBridge accepts graphics and provides output that's identical to the original.

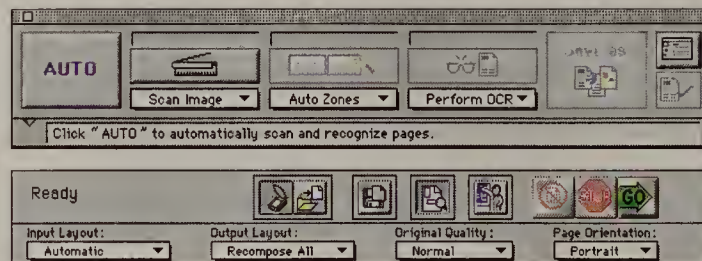
Both programs launch to create a simple tool bar from which you control the OCR process—acquiring the image, adjusting program settings, and performing character recognition. But where OmniPage's tool bar has a button that brings up a Preferences box, TextBridge puts the preferences right on the tool bar in pop-up menus. And while TextBridge lacks keyboard commands for everything except Quit, OmniPage's menus are filled with them.

Postscan Tweaking

The more time you spend tweaking a scanned document before putting it through OCR, the happier you'll be with the results. Both TextBridge and OmniPage let you lighten or darken the scan and set *zones* that tell the program what to scan as text, what to treat as a graphic, and what to ignore. TextBridge handles this pre-OCR fiddling with aplomb; it scans the image, then pauses while you decide if the quality is acceptable. During this pause you can—and should—use the Smart Zone controls (to capture only a portion of the scanned text, for example, or exclude areas you don't want). OmniPage, on the other hand, insists you draw a box around everything you want to keep. But it also flags questionable text, an

invaluable feature that lets you make changes *before* importing the OCR document into another application.

With either program, be prepared to spend some time comparing output with the original and checking spelling. All my sample input—even a high-quality business letter—came out with errors. OmniPage averaged as many errors on the busi-



A Tool Bar for All Occasions In both OmniPage Pro (top) and TextBridge Pro (bottom), you control OCR from a tool bar.

ness letter (3) as on a newspaper clipping. It did slightly worse on a page from *Scientific American* (5 errors) and a simple newsletter (4 errors). TextBridge did worse on the *Scientific American* sample (12 errors) and the business letter (6 errors) but matched OmniPage's performance on the newspaper clipping. Despite its abysmal performance on *Scientific American*, TextBridge yielded only 1 error on the newsletter. Finally, both programs flunked out on a photocopied flyer with a mix of fonts and styles, handwriting, and poor-quality clip art.

The Little Touches

Both programs install a mini application in the Apple menu for instant access from any application. OmniPage calls this Direct Input; TextBridge calls it Instant Access. Direct Input is faster, gives you the option of saving to the Clipboard or the open application, and quits automatically, but it's text-only; Instant Access supports graphics as well as text.

Both programs give you several output options: unformatted text, unformatted text with graphics, or an exact replica of the original, right down to graphics, styles, and columns. That last option—which OmniPage calls TruePage and TextBridge calls Recomposing—is so sublime I can't imagine using OCR without it. The trade-off is additional processing

time, but after seeing the results, I didn't mind the extra few seconds per document.

Both OmniPage and TextBridge save OCR documents in a variety of formats, including HTML (text only, unfortunately). If you use TextBridge with Microsoft Word, however, you have to save your files in RTF format instead of Word 5 or 6.

When used with Word 5.1, TextBridge was better at placing headers and footers from scanned documents into headers and footers in the output documents, while OmniPage dumped them into the body of the output documents. But OmniPage did a better job with graphics: it recognized and retained gray-scale images, while TextBridge rendered graphics as coarser halftones.

Finally, OmniPage takes less RAM—4.5MB compared with TextBridge's required 6.1MB (it prefers more than 10MB). But TextBridge works on 68020 Macs with System versions as old as 6.0.5, while OmniPage requires System 7 and a 68030 or better machine.

The Last Word

The perfect OCR program would combine OmniPage's tool bar, flagged-text feature, and accuracy with TextBridge's Smart Zones and price tag. Barring some improbable merger of Xerox and Caere, however, I cast my vote for OmniPage Pro; the flagged-text feature is simply indispensable.—SUZANNE COURTEAU

OmniPage Pro 6.0

RATING: ★★★★★/7.1 **PROS:** Flags unrecognized text; handles gray-scale graphics; better accuracy than TextBridge Pro. **CONS:** No graphics via Direct Input. **COMPANY:** Caere (408/395-7000, opsales@caere.com). **LIST PRICE:** \$699.

TextBridge Pro 3.0

RATING: ★★★★★/7.0 **PROS:** Easy to choose areas you want to scan; Instant Access supports graphics. **CONS:** Doesn't flag unrecognized text. **COMPANY:** Xerox (508/977-2000, textbridge@xis.xerox.com). **LIST PRICE:** \$349.

QuickBooks Pro 4.0

LACKS SOME FEATURES INCLUDED IN WINDOWS VERSION

LAST AUGUST'S RELEASE OF INTUIT's QuickBooks Pro added true job-costing and time-billing functions to Intuit's already well-received basic accounting system. Version 4.0 adds a number of customizing and ease-of-use features, and significantly enhances Pro's tax-reporting capabilities.

Getting Started

Do it right, and it's easy to start using an accounting program; do it wrong, and you may never be able to produce the information you want. During installation, EasyStep Interview asks questions about your business, the way you work, and the information you want your accounting system to provide. Based on your responses, QuickBooks is customized to meet your needs. Capabilities you don't currently need can be restored later. EasyStep Interview anticipates most problems, and in its Tell Me More sections it provides explanations of accounting procedures and suggestions for handling special situations.

Bells and Whistles

QuickBooks Pro's documentation provides special customizing assistance for your company. Clear and concise, the help files are full of suggestions for configuring QuickBooks to meet specific tax-reporting requirements.

QuickBooks includes accounts receivable, accounts payable, inventory, payroll, estimates, and budgeting. The program enters accounting transactions on invoices, purchase orders, time slips, and other familiar forms, and there's no debit and credit jargon. Standard reports—aged accounts receivable, accounts payable cash requirements, and income statements—are also available.

Version 4.0 offers more business-management functions than previous versions have. For example, you can use customer, vendor, employee, and other lists to produce mail-merge files, address-file cards, and mailing labels. You can customize reports and forms by adding, deleting, renaming, and reordering information in headers and columns. You can even create a direct link from customer

notes to the To Do list to help schedule callbacks and meetings.

However, the mail-merge function has limitations. For example, you can't automatically select all customers with balances over \$10,000. And although the lists are flexible and effective, they're not WYSIWYG: it's frustrating to try to design a report without being able to see what it looks like.

Payroll reporting includes printing of Forms 940 and 941, as well as W-2, W-3, and 1099. Although not a magic solution to payroll-reporting woes (you must still reconcile tax-form totals and manually enter some information), the

ITEM	DESCRIPTION	QTY	COST	AMOUNT	MARKUP	TOTAL
Framing	Framing labor and materials	500.00	1,500.00	1,500.00	3,000.00	
Electric	Wiring and fixture installation	500.00	500.00	300.00	800.00	
Finish	Paneling	2,200.00	2,200.00	1,000.00	3,200.00	
Finish	Install ceramic tile	1,500.00	1,500.00	1,500.00	3,000.00	
Total			5,700.00	4,300.00	10,000.00	

In Control QuickBooks Pro 4.0 lets you compare actual costs incurred and client billings with the original estimate.

program is an improvement. Income tax-reporting enhancements include the ability to link revenue and expense-account information to the appropriate lines on your tax return, producing totals as they would appear on a tax form. The Windows version includes interactive links to Intuit's popular tax program Turbo Tax; links to MacInTax, its Mac counterpart, are unfortunately not yet available.

To use Job Costing, you identify the items purchased and expenses incurred on a particular job. When it's time to bill the client, you simply select from the list of charges. QuickBooks can automatically mark up costs by a specified percentage or charge a predetermined rate for you, or you can adjust amounts individually on the invoice. The reports compare the original estimate, actual costs incurred, and amounts billed on a job-by-job basis.

Time spent by hourly and salaried employees—and even subcontractors—is easily entered and tracked by job. Time calculations can be used to bill the client at a specified rate or simply to track profitability. You control the amount of detail that appears on the invoice—for example, totaling charges for several employees and billing them as a single item. For hourly employees, time data can automatically generate payroll checks.

On the Downside

The recording and reporting features, although impressive, come at a cost. More choices mean more decisions. And the number of decisions needed to set up and integrate the estimating, job costing, payroll, and time billing features can be overwhelming. Novice users might want to implement only simpler procedures—paying bills, making deposits, producing standard statements—and add more advanced features later.

Despite increasing requests from users, this release does not include a network version. It does, however, offer file compatibility between the Windows and Macintosh platforms. While not an ideal solution, this allows information sharing.

My biggest gripe is that the Business Library, an excellent addition to the Windows version, is not available for the Mac. This CD-based program contains information on everything from creating a business plan, to tax-saving strategies, to worksheets that can be used to calculate and interpret financial ratios and evaluate pricing strategies, and more.

The Last Word

For functionality, versatility, and ease of use, QuickBooks Pro is hard to beat. Its estimating, job costing, time billing, and payroll features are the best in this price range, and its innovative customization program helps you take advantage of its full range of capabilities.—JAN GILLESPIE

RATING: ★★★★★/7.7 **PROS:** Can be customized for your business; excellent estimating, time-billing, and job-costing capabilities; user-defined fields for most records. **CONS:** No multi-user capabilities; report- and form-customization procedures not WYSIWYG; interactive tax features, Business Library, and some Windows features not available for the Mac. **COMPANY:** Intuit (415/944-6000). **LIST PRICE:** \$189.

Amazing Writing Machine and Alien Tales

BRØDERBUND ENLIVENS CLASSIC LITERATURE AND CREATIVE WRITING FOR KIDS

A LOT OF COMPUTER BASHING IS based on the belief that computers make the written word obsolete. Concerned observers will be delighted to find that two of Brøderbund's new products—Amazing Writing Machine and Alien Tales—develop traditional reading and writing skills in an engaging, nontraditional fashion.

Amazing Writing Machine

Amazing Writing Machine inspires kids to write by making it easy for them to publish their own creations. For those with a case of writer's block, Spin mode offers finished documents with phrases kids can alter by selecting predefined phrases or typing their own. In Write mode, more-creative kids can start from scratch on their own essay, letter, story, poem, or lockable journal.

Each option has tools for layout, drawing, painting, editing, adding electronic rubber stamps and rebus symbols, encoding text—even having robots read it aloud! Noisy Typing—sounds that parents will be relieved to find can be turned off—gives fun, audible feedback for the junior user.

A Bright Ideas tool offers quotes, jokes, trivia, and topical word lists; Brainstorm gives prompts to spark ideas.

The Goodies menu *is* a goody. It includes an InfoSaurus to help kids find rhyming words, a rubber-stamp editor, and an address book with an extensive built-in database of people and organizations willing to receive letters from children. Kids can add their friends' addresses easily.

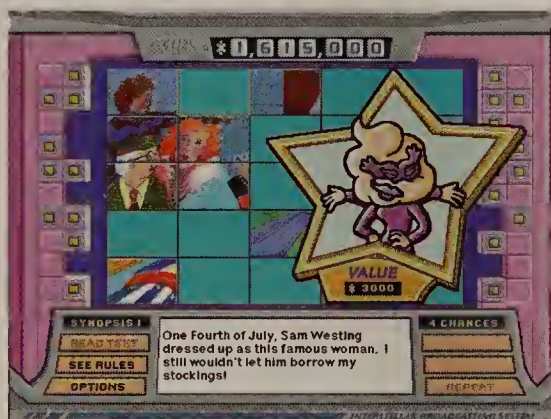
Amazing Writing Machine makes use of your existing TrueType fonts and Kid Pix stamps. You can import graphics in PICT form, but there are limitations in placing them, especially in some special-shaped layouts.

Although Amazing Writing Machine offers several print options, we couldn't always get the selection we wanted. The program insisted on printing a journal cover, for example, even for a single entry. And despite its colorful on-screen graphics, Amazing Writing Machine can't print text in color.

Alien Tales

By offering kids a familiar—perhaps *too* familiar—metaphor, Alien Tales builds reading comprehension and entices the player to classic children's literature. You're the earthling contestant in an interstellar game show, pitted against alien celebrities who claim to have written many of our planet's books.

The emcee is a witty character whose remarks don't always quite fit the occasion, but his wonderfully bad puns make up for it. In two rounds you must show



Pick a Square In Alien Tales' Ganyমেde Squares, the correct multiple-choice answer to the alien's question uncovers a square of the book's illustration.

you know enough to prove a book was written on Earth; a final round offers you the opportunity to show what you know about the book's author.

Before each round, you're given synopses, excerpts of a book, or a brief biography of the author. You can always refer back to these texts during a question, but you don't earn as many points—called Starbucks—that way. These text pieces are the crux of Alien Tales.

Round one quizzes are based on two classic game shows, with a spacey twist: To Tale the Truth, which asks true/false questions, and Ganyমেde Squares, in which you interact with "celebrities" (see "Pick a Square"). At the round's completion, you uncover an illustration from the book, which becomes the basis for the next round, a timed crossword puzzle. With each correct answer, part of the picture is uncovered and you get a letter to help you complete the puzzle. If you're stumped, you can buy a letter. Defeat the alien in these two games, and he/she/it is

mashed and sent off to be reconstituted. Defeat the same being twice, and it's shipped back to its home planet.

The third round—where you wager some of your winnings—may be Meteor Match, matching two columns of facts about the author's life, or Stump the Human, solving a cryptogram with letters you earn by answering questions.

A lot of controlled lunacy went into this game, along with a mountain of research. In all, 30 books are represented, many of them Newbery Award winners. We were amazed to find our kids heading for the bookshelf for their old favorites after Alien Tales' brief excerpts refreshed their memories.

The Last Word

Amazing Writing Machine and Alien Tales are so engaging that if you don't mention it, kids won't think twice about their educational value. Our homegrown panel of experts clamored for repeat sessions on both programs. With their high regard for literature and writing skills, and the attitude that both subjects are accessible to children, these two programs are poised to do for reading and writing what Carmen Sandiego did for geography.—DAVE AND ROBIN MINNICK

Alien Tales

RATING: ★★★★★/8.1 **PROS:** Entertaining; develops reading comprehension; entices players to read; good "bad" puns. **CONS:** Emcee's remarks are sometimes off target. **COMPANY:** Brøderbund (415/382-4700, webmaster@broderbund.com). **COMPANY'S ESTIMATED PRICE:** \$45.

Amazing Writing Machine

RATING: ★★★★★/6.8 **PROS:** Stimulating; encourages imaginative expression; neat Noisy Typing sounds; well-rounded templates. **CONS:** Print options have limitations; imported graphics touchy to place; no color printing for text. **COMPANY:** Brøderbund. **COMPANY'S ESTIMATED PRICE:** CD \$45, floppy \$35.

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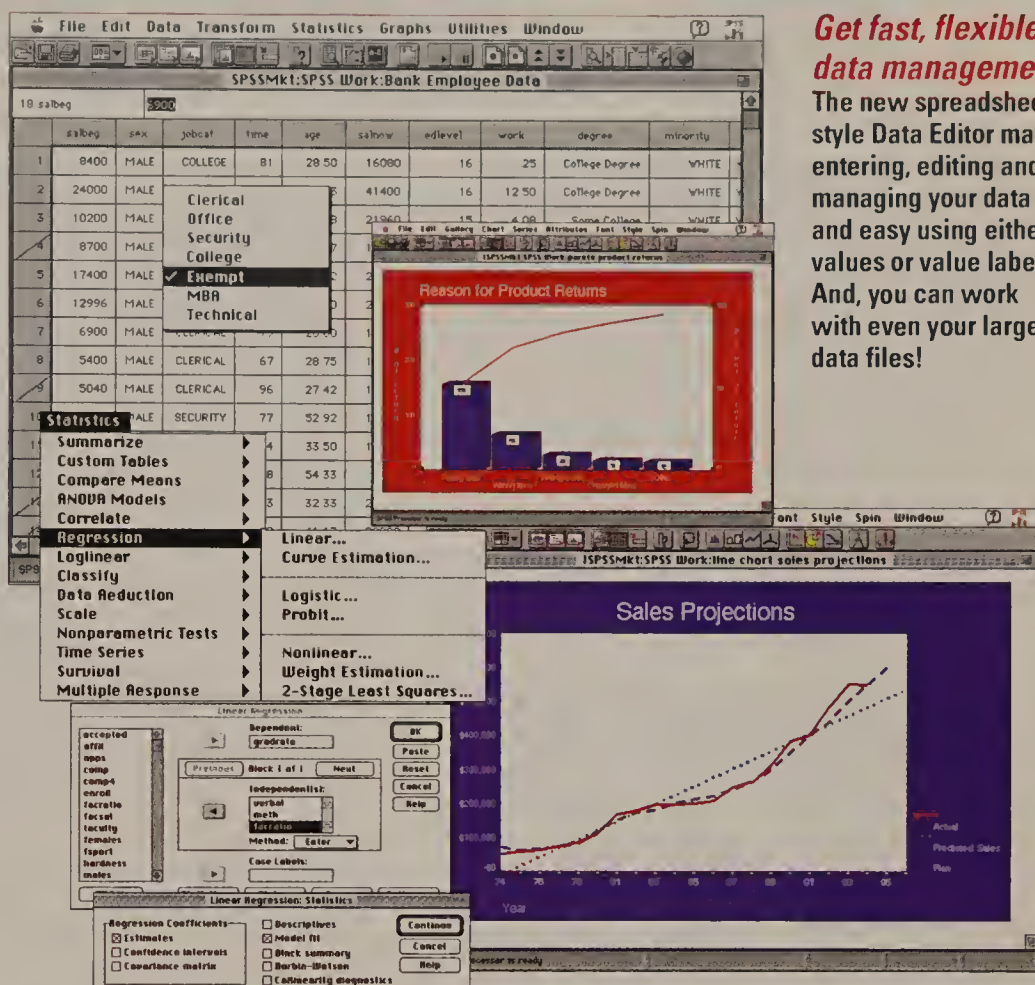
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PageOffice

ANOTHER PERSONAL PAGE SCANNER
ENTERS THE FRAY

AS THE MARKET FOR PERSONAL desktop scanners heats up, it's finally attracting mainstream scanner vendors. While Hewlett-Packard is playing it safe by re-packaging the already successful Visioneer PaperPort under the HP label as the ScanJet 4s, Umax is selling its own PageOffice, with modular software tools for manipulating scanned documents.

The PageOffice, a StyleWriter-size multisheet scanner, is capable of 300-dpi and 8-bit (256-shade) true gray-scale imaging. Its 10-page sheet feeder permits unattended operation, but it can't accommodate documents smaller than dol-



RICHARD RETHMEYER

lar-bill size, ruling out business-card scanning. Connected via SCSI, the PageOffice scans quickly, but postscan processing is slow.

Umax provides document-management software and documentation for Mac and PC users, but it shortchanges Macintosh users with a skimpy 50-page unindexed pamphlet. A cursory look at the PC documentation shows many features that are nonexistent or undocumented in the Mac software.

Unlike that of the PaperPort, the PageOffice's design is not conducive to spontaneous scanning. First you must turn on the scanner (you won't want to leave the PageOffice on all the time—it emits heat and light continuously). Next you launch the software, which can be time-consuming if you have a lot of documents in the software's in basket. Then, after inserting the pages to be scanned, you press one of two buttons—document (for monochrome) or photo (for gray scale)—to begin scanning. Finally, after each page is scanned, the software com-

presses and stores the image in the in basket. This takes a few seconds for monochrome scans and up to a minute or more for gray-scale scans.

A desktop environment represents documents as icons. Once the documents are scanned, you can arrange, stack, perform OCR on, print, fax, file, and E-mail them via drag and drop. You can create multiple desktops in the form of document folders, which simplifies document storage. Interapplication links let you drag and drop documents between a desktop and other applications. You can annotate documents with "sticky notes," typed text, lines, circles, and arrows; as well as perform basic image-manipulation tasks such as flip, rotate, or change contrast. You can retrieve stored documents by keyword, modification date, or creation date.

You can use the integrated OCR capability or graft in any OCR processor using interapplication links. Accuracy with the built-in processors is adequate, but for heavy-duty OCR work you'll need a more sophisticated tool.

The PageOffice can export gray-scale images in TIFF, JPEG, and PICT. Alas, image-enhancement tools, such as equalization, contrast and saturation adjustment, smoothing, mosaic, and emboss—in the PC version—are missing from the Mac software. This severely limits the utility of the PageOffice as an art scanner.

A few user-interface quirks make the software somewhat difficult to use. For example, while a document is open, its icon can't be moved; with several documents open, the image desktop becomes impossible to rearrange.

The Last Word

For individual, impromptu scanning where convenience and speed are important, the PaperPort remains unbeatable. The PageOffice is better suited for high-volume dedicated paper processing, where numerous documents must be scanned and filed.—MEL BECKMAN

RATING: ★★ ★/6.6 **PROS:** 256-level gray scale; 10-page sheet feeder; document-filing, -management, and -annotation tools; OCR; links to fax, E-mail, and text applications. **CONS:** Inconvenient for quick scans; slow postscan processing; skimpy Mac documentation. **COMPANY:** Umax Technologies (510/651-4000, sales@umax.com). **LIST PRICE:** \$349.



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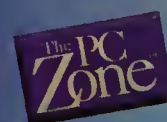
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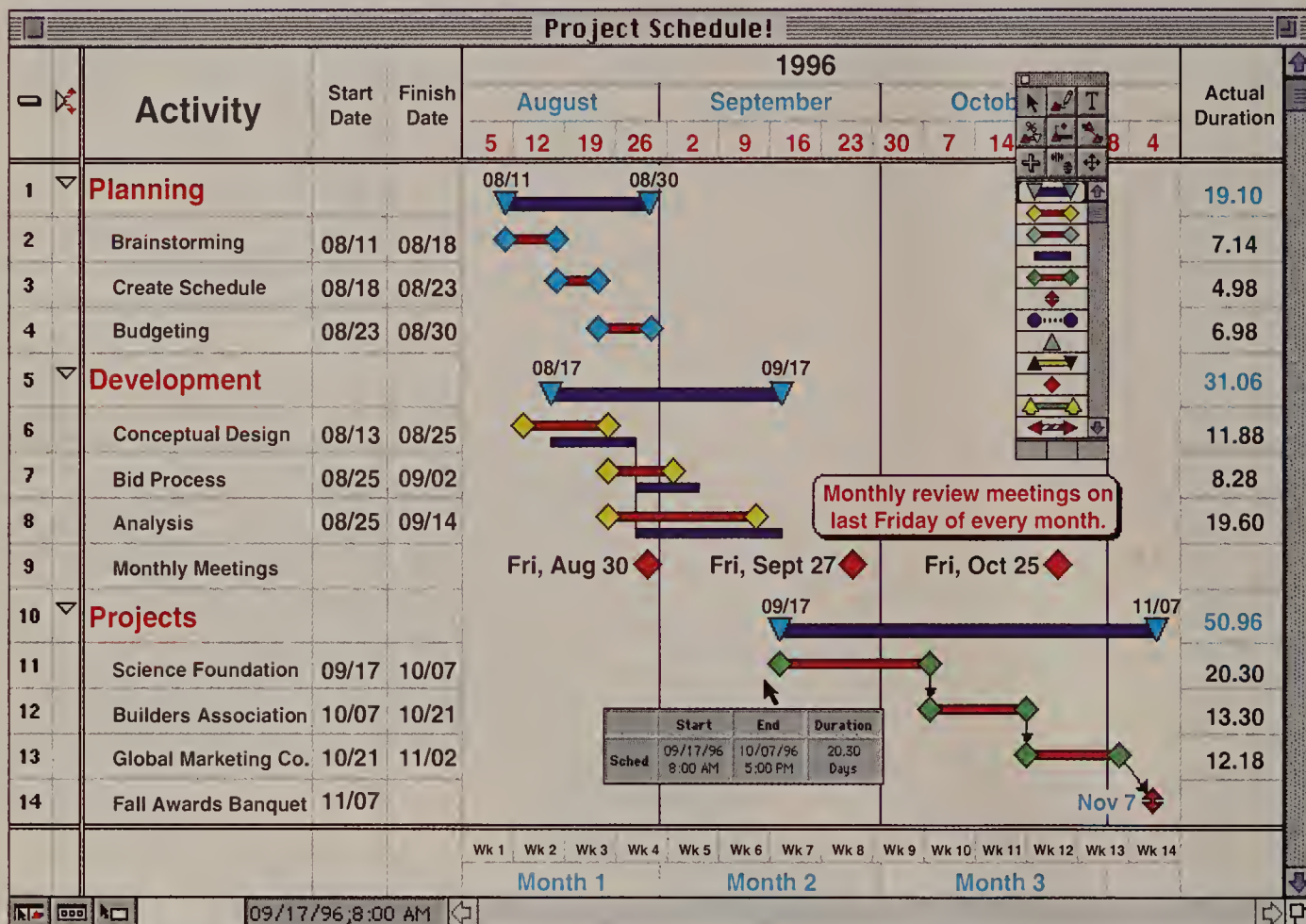
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MacWEEK



BBEdit 3.52

A WEB-AUTHORING TOOL
FOR POWER USERS

BBEDIT IS A TEXT EDITOR. IT'S NOT a word processor, it's not a WYSIWYG Web-authoring tool, and it's not a program for beginners. If you're looking for any of these things, look elsewhere. But BBEdition is still a cult favorite among Web authors—with good reason.

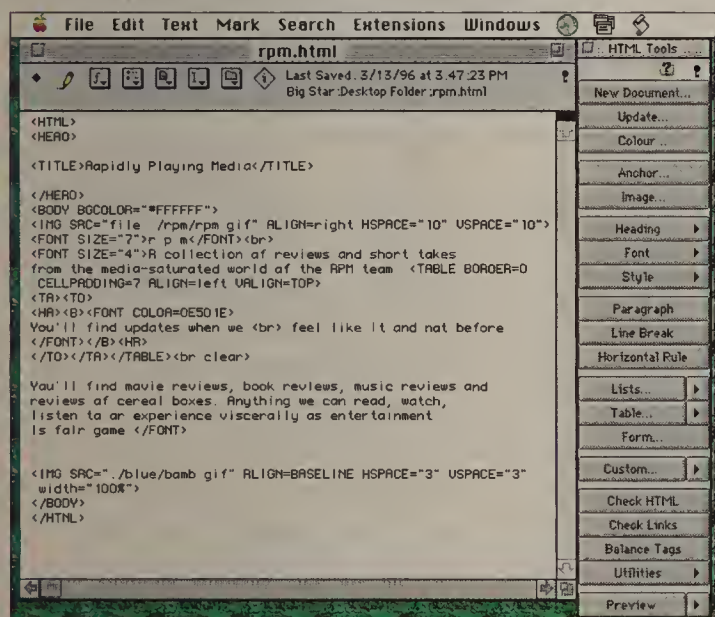
BBEdit was designed for programmers who work with text and programming code. Consequently the interface is more functional than pretty or intuitive, and it can be intimidating. It has more menu items than Liberace had spangled tuxedos. But working with HTML generally isn't pretty. HTML documents are

third-party (including Netscape) HTML extensions. Clicking on a button inserts the appropriate HTML tag for formatting a document. When you highlight text in a document, BBEdition correctly brackets the text with tags. It's also easy to assign key commands to tags you use a lot.

While it isn't WYSIWYG, BBEdition does support drag and drop and has a Find File dialog box for image placement and linking, so you don't have to type out complete path names. You can also drag text, files, or images onto some of the palette items. For instance, dragging a file onto the Anchor button creates a link to that document.

BBEdit has all the basic text-editing tools you might need, including excellent search-and-replace features, good scripting support, and a spelling checker. You can configure and tailor preferences to a high degree. The program uses Internet Config (not included) to give you access to your Internet applications from the menu bar. A preview button on the palette automatically launches your browser and displays the document you're working on.

BBEdit is not an all-in-one Web tool. You'll need to use Adobe Photoshop or Equilibrium's DeBabelizer to create and optimize images for the Web; BBEdition just places them in your HTML documents. This is also true for clickable image maps. BBEdition's strength is the creation of HTML files.



So Many Menus, So Many Choices Sure, it's an interface only a programmer could love, but once you learn your way around it you'll be a master HTML chef.

written in code; you need a Web browser to interpret them properly. And as any programmer will tell you, the closer you are to the code, the more control you get over the final results.

While it isn't as easy to use as Adobe PageMill, BBEdition is more sophisticated and powerful, making it ideal for people who understand how HTML works and need to push Web design to the limits. Most of BBEdition's HTML features were added as extensions to the main application, but they are nicely implemented.

You work in an edit window with a floating palette that lists HTML tags. BBEdition supports most of the popular HTML tags, including tables, backgrounds, and a good selection of the

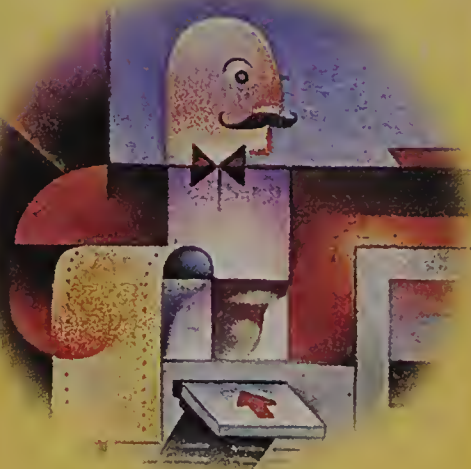
The Last Word

Until we have very robust WYSIWYG Web tools, Web designers need to know how to write HTML tags and understand how they work. BBEdition has a steep learning curve, but the control and power it offers are worth the effort for those designers who need to be on the leading edge of Web design.—MATTHEW HAWN

RATING: ★★/6.5 **PROS:** Good customizability; excellent find and replace tools; well-implemented extension architecture. **CONS:** Complex interface; steep learning curve. **COMPANY:** Bare Bones Software (508/651-3561, info@barebones.com). **PRICE:** \$119 (available online as freeware).

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Reviews

CD-ROM—Acceleration Software

CACHING SCHEMES MAY OR MAY NOT IMPROVE PERFORMANCE

A CD-ROM IS A HANDY WAY TO store data but an awfully slow medium from which to retrieve it. If you're using the Apple CD driver software that came with your computer, you may be thinking about replacing it with a third-party accelerator to improve your CD-ROM drive's performance. Two such products, CharisMac's CD AutoCache 1.1 and FWB's CD-ROM ToolKit 2.0.1, are designed to do just that. Unfortunately, despite claims of performance improvements, the boost they provide is minimal and comes at the expense of RAM and hard-disk space.

Both programs try to speed up access times by caching information from your CD-ROM to your hard disk or RAM, but they differ slightly in how they go about it. To retrieve data quickly, CD AutoCache records the CD's directory in RAM and on the hard drive; CD-ROM ToolKit uses a static cache to store data from the CD in RAM and a dynamic cache to store recently used information in RAM and on the hard drive. CD AutoCache

ically on Apple's driver software. I tried both programs on my 9500 (which has an Apple 600i CD drive) and a Power Computing PowerWave 604/150 (which uses a Toshiba 4× CD drive), and the performance boost was negligible. Macworld Lab tests using Apple 600i and 300+ CD-ROM drives showed that both programs offer some slight speed gains over Apple's CD software, but there's only a one- or two-second difference.

CD AutoCache froze when we tried to duplicate a large file on a 7500/100, and it took some fiddling with system extensions to get the program to work on a 7100/80 (I had no problem on my 9500). CD-ROM ToolKit was more reliable, but the installation process has a silly quirk: after you insert the installation disk and launch the installer, the program asks you for a serial number—which is on the disk you've just inserted.

The Last Word

If you have an Apple CD-ROM drive, you already have good—free—software for running your CDs. The alternatives only offer a slight performance boost and a few more features in the CD-player programs. If you have a non-Apple CD-ROM drive, which won't work with Apple's software, consider the reliable, well-designed CD-ROM ToolKit; just be prepared to give up a chunk of RAM and hard-disk space to get the most out of it.—GENE STEINBERG



Cache Flow FWB's CD-ROM ToolKit provides optimized caching for popular CDs.

comes with a nifty-looking CD-player program that supports multidisc CD changers and lets you store a custom playlist of your favorite CDs. CD-ROM ToolKit's Audio Control is similar to this program but is PowerPC native (though no performance advantages are apparent).

Both programs display estimates of the speed boost you're getting, have adjustable cache settings for popular CDs (see "Cache Flow"), let you extract 16-bit stereo audio from your CDs, and support most of the CD-player makes and models you're likely to encounter.

For all that, neither CD AutoCache nor CD-ROM ToolKit improves dramat-

CD AutoCache 1.1

RATING: ★★/3.8 **PROS:** Nice interface; flexible CD audio player. **CONS:** Buggy; minimal performance boost over Apple's driver. **COMPANY:** CharisMac Engineering (916/885-4420, charismac@aol.com). **LIST PRICE:** \$79.95.

CD-ROM ToolKit 2.0.1

RATING: ★★★/5.4 **PROS:** Attractive interface; reliable performance; flexible CD audio player; PowerPC native. **CONS:** RAM-hungry; minimal performance boost. **COMPANY:** FWB Software (415/325-4392, info@fwb.com). **LIST PRICE:** \$79.

Star Wars Games

USING—AND LOSING—THE FORCE

THE ELECTRONIC GAMING COMMUNITY has seen its share of themed releases based on George Lucas's popular *Star Wars* trilogy. The most recent additions to this genre are Rebel Assault II and X-Wing Collector's CD-ROM. Both products build upon the *Star Wars* universe with game play based on the movies, but also offer cinematics and plots that extend beyond the original films.

Rebel without a Cause

One of the biggest drawbacks of CD-based games is the developers' propensity to fill space with full-motion video



Brave New Worlds Rebel Assault II relies heavily on full-motion video to add excitement to its otherwise minimal game play.

(FMV) clips. Although these scenes add atmosphere, often they end up supplanting game play as the entertainment. Rebel Assault II has this problem, offering weak game play that relegates you to lots of watching and little interaction.

Most of Rebel Assault II's action follows a set path, with little or no deviation possible. For example, while learning to fly a TIE fighter—the rebels' signature craft—you follow your teacher on a canyon run. Rather than mastering the ship's controls, you're mostly limited to memorizing the course and avoiding contact with the walls.

Even gun battles follow a similar pattern: unlike the Doom-esque experience of LucasArts' Dark Forces (see "1995 Macintosh Game Hall of Fame," January 1996), Rebel Assault II's combat involves firing on enemies in the same two or three spots on screen—a simple test of cross-hair-moving speed rather than a skillful engagement of foes.

On the bright side, you can adjust the game's difficulty by editing a table of

parameters, which makes the task of fighting the Empire a bit less ponderous. And if you're a *Star Wars* fanatic, the new FMV segments make thrilling connectors between the action sequences.

Into the X-Wing of Things

X-Wing Collector's CD-ROM doesn't immerse you in realistic FMV, but relies on simpler animation to get the point across. This leaves plenty of room on the CD for more than 120 space-exploration and combat missions.

Best of all, X-Wing offers you freedom to travel around the universe. If you miss a target, you can circle around and try again. After you play a mission, you're free to try another strategy.

Where Rebel Assault II requires little more than the arrow keys and a fire button, X-Wing enables you to administer flight navigation, weapons, shields, and targeting systems through a slate of key-strokes. The learning curve is steep, but the results are worthwhile.

You also have the ability to change your perspective on the action, from inside the cockpit to a bird's-eye view on the playfield through a movable "camera." You can also record a section of a mission and analyze your strategy later.

The Last Word

Both games are sluggish on a 68040 Mac, and Rebel Assault II is also handicapped by its minimal game play, which isn't very compelling or enduring. X-Wing's flexibility and extensive game play provide lots of replay value and make it a *Force* to be reckoned with.—ANDY EDDY

Rebel Assault II

RATING: ★★/3.9 **PROS:** Exciting new video segments; game difficulty is editable.

CONS: Restrictive game play is tedious and repetitive; slow on 68040 Mac. **COMPANY:** LucasArts Entertainment (415/472-3400). **LIST PRICE:** \$54.95.

X-Wing Collector's CD-ROM

RATING: ★★★★★/8.3 **PROS:** Flexible game play; high replay value. **CONS:** Controls create a steep learning curve; slow on 68040 Mac.

COMPANY: LucasArts Entertainment (415/472-3400). **LIST PRICE:** \$59.95.

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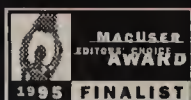
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Micro Planner Manager 1.4

PROJECT-MANAGEMENT APPLICATION TAKES SCHEDULING SERIOUSLY

MICRO PLANNING INTERNATIONAL was first on the scene with project-management software, and its latest offering shows that it's kept abreast of scheduling techniques. Geared toward marketers, consultants, and events managers, Micro Planner Manager 1.4 is a midrange package that lets you manage 1500 tasks, 500 calendars, and 500 resources. It offers most of the sophisticated scheduling and reporting functions of the \$1995 Micro

eral menu selections to choose a schedule or resource option).

Micro Planner Manager's financial functions let you change the cost rates for resources (up to 20 times during a project) and calculate costs to date, projected costs, and costs to complete the project. You can generate standard reports, such as network diagrams, tables, cost trends, and progress reports, and refine them with sort and selection filters. You can even generate custom reports using the supplied report writer.

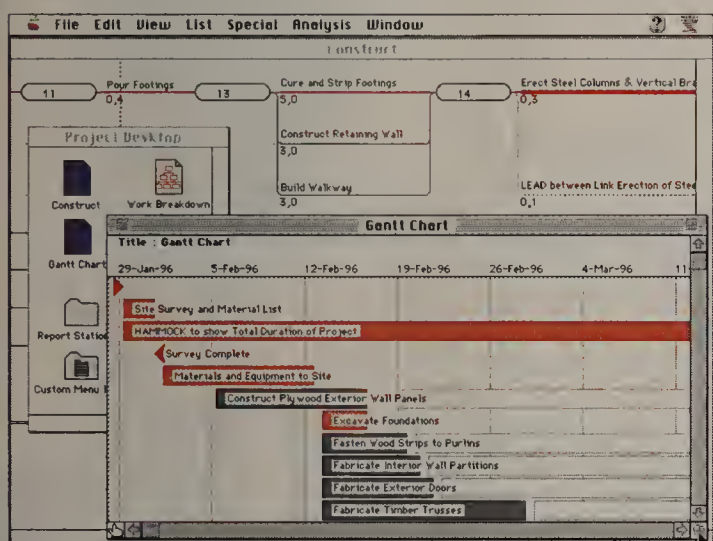
It's fairly easy to update schedules once you're under way. The new Auto Progressing function assumes all work is on schedule, so you update only the off-schedule tasks manually. For instance, if a task is behind schedule due to bad weather, you can open a Gantt chart and drag bars to alter the task duration or to indicate how much work is complete. Other programs allow interactive scheduling changes but are less meticulous when it comes to calculating progress automatically.

Version 1.4's scheduling engine calculates only those tasks affected by your last change, improving scheduling speed. And this version is speedier overall because it's PowerPC native.

The Last Word

Micro Planner Manager gives you a solid scheduling and resource-management tool, and its project files are compatible with those of the Unix and Windows versions. But unless you're collaborating on schedules or require advanced scheduling features, the \$499 Microsoft Project might be a better choice.—MIKE HECK

RATING: ★★ ★/6.9 **PROS:** Multiple data entry options; extensive scheduling, cost-control, and resource-analysis functions; custom-report writer; fast scheduling. **CONS:** Requires project-management skills to use effectively; passing data between projects can be difficult. **COMPANY:** Micro Planning International (303/757-2216, sales@microplanning.com). **LIST PRICE:** \$695.



Choose Your Chart Micro Planner Manager lets you enter and track projects using interactive network diagrams and Gantt charts, which you can easily customize and print as reports.

Planner X-Pert, a more complex version for full-time project managers who control resources in several locations.

Micro Planner Manager uses a desktop metaphor with folders for project items, such as resources and calendars, so building a project framework isn't difficult. You create an actual project by placing and connecting nodes on a PERT network chart or using the more familiar bar-chart (Gantt) display. If you're unfamiliar with the terminology, however, either approach can be intimidating—Micro Planner Manager lacks wizards, and screens aren't always well designed. Fortunately, the documentation has been improved since the last version.

On the other hand, experienced project managers should appreciate the tight scheduling control the program offers. Micro Planner Manager also adjusts task duration to reflect a resource's efficiency—for example, to allow an apprentice more time than an experienced artisan to finish a job (though you have to make sev-

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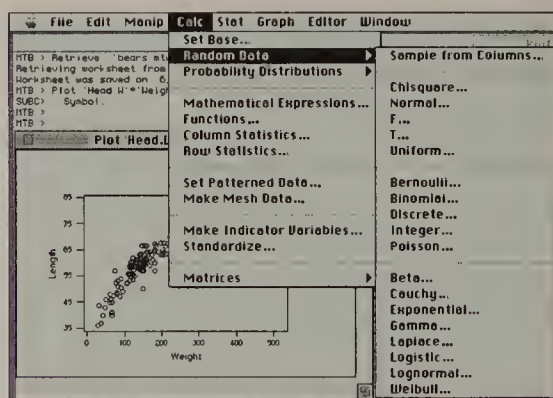
Minitab 10 Xtra

UPDATED PACKAGE OFFERS A COMPLETE STATISTICAL TOOL KIT

AS A COMPANY, MINITAB IS OLDER than Apple or Microsoft. The name alludes to its popular mini-computer-based statistics programs, developed in the early 1970s. In fact, Minitab runs on several computers you can't even buy anymore.

But unlike some Mac applications, Minitab hasn't always been helped by its venerable ancestry. Because it has traditionally held a large share of the university instructional market, Minitab has had little incentive to modernize, and for years its software lacked exploratory-graphics features, advanced chart types (3-D surface and wire frame), and a macro language.

Minitab Release 10 Xtra fills out even the most demanding Minitab user's wish list with admirable thoroughness. The



Take Your Chances Using this list of built-in probability distributions, you can generate new kinds of empirical statistics with Minitab's macro language.

graphics package, for example, is completely new, and offers not only the long-hoped-for 3-D and exploratory graph types but a complete set of modern drawing and annotation tools (including graph "brushing" for highlighting selected sets of points). Minitab has always been a good choice for black-and-white scientific-journal graphs; now it can do flashy, custom-color, dazzle-your-investors work too, complete with overlays and graphs-within-graphs.

Release 10 Xtra includes new features that should have been added years ago (x - y scatterplots with regression data, for example), and others that come as a pleasant surprise. Not only is Minitab's time-series analysis as good as any stand-alone program's, but 10 Xtra includes cluster analysis with appropriate graphing tools.

Minitab's new release also puts it ahead of its competitors in the field of industrial statistics. The quality- and process-control menu in Release 10 Xtra has more tests and more control-chart types than other Mac statistics programs. Other general-purpose packages can't compete with Minitab's design-of-experiments facility, either in scope or in documentation. People have been using Minitab for decades to optimize manufacturing activities, and it shows.

Another important strength of this edition of Minitab is the combination of a simple, BASIC-like macro language with two large classes of math functions: matrix-manipulation functions and probability distributions (see "Take Your Chances"). Not only can you program your own custom versions of standard tests, but you can develop whole new classes of tests, bridging the worlds of classical Fisher-type statistics and newer bootstrap/resampling methods—impressive for a program that's compatible with dozens of college textbooks.

The only downside of this edition of Minitab is that it was developed as a Windows-first, Macintosh-ported program. Because of this, it shares several characteristics with oft-maligned ported products such as Word 6: it launches slowly, it's huge (Minitab needs virtual memory on a 16MB Power Mac), and most tool-bar and icon conventions follow Microsoft—rather than Macintosh—conventions. Its 100 percent compatibility with both Mac and Windows will appeal to mixed environments, but its implementation is occasionally awkward and sluggish at some tasks, especially compared with Mac standbys Data Desk from Data Description or Abacus Concepts' StatView.

The Last Word

You can quickly program any statistical test not offered by Minitab with simple macros, making this a serious all-in-one package. The feature set covers the needs of every user, from first-year students to research professionals.—CHARLES SEITER

RATING: ★★★★★/7.2 **PROS:** Exceptionally complete, well-organized program. **CONS:** Windows compatibility results in less-than-optimal code. **COMPANY:** Minitab (814/238-3280, sales@minitab.com). **LIST PRICE:** \$895; academic price \$495.

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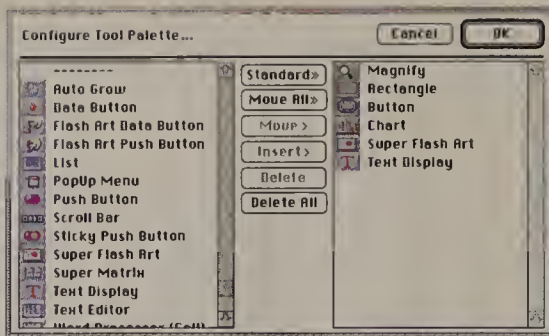
Panorama 3.0

DATABASE ADDS CLIENT/SERVER,
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FROM THE BEGINNING, PROVUE chose to improve performance by loading the active data files entirely into RAM, rather than accessing them from disk, as with most databases. ProVue gambled that available RAM in a typical Mac would be sufficient for real business databases—a questionable bet six years ago.

Panorama 3 is still RAM-based—and is still stunningly fast. Its relatively austere look has been replaced by a lush, graphics-oriented environment. Panorama 3 offers multiuser client/server capabilities, a built-in word processor for mail merge, AppleScript capabilities combined with a greatly expanded macro language, and a remarkable feature called SuperObjects.

ProVue struck a deal with Everyware, maker of the Butler SQL relational database, to provide a SQL server that works with Panorama. The “partner/server” technology is a way for client machines to select and work with subsets of large server SQL databases so that client RAM isn’t overwhelmed by the server’s whole data file. The Panorama client and server synchronize



Superior Components SuperObjects simplify the development process, letting you drag self-scaling, easy-to-use buttons, check boxes, scrollable text windows, and other elements onto a form.

data automatically with all other clients on the network, or with clients who may be off the network for hours or days at a time.

The word processor accepts database field names directly, making standard form-letter mail merges a snap. This function is scriptable, and programmable with Panorama’s extensive macro system, so form letters can have different content and graphics depending on field values. Panorama developers have produced amazingly rich “variable forms,” and most such documents would require great ingenuity to generate in ACI US’s 4th Dimension or Claris’s FileMaker Pro, if they could be done at all.

Among the most impressive new features are the SuperObject types for inter-

face building, with the closely related Elastic Forms capability (see “Superior Components”). Through a simple dialog box, you can link field data to buttons, check boxes, and other data entry conveniences. These elements are most typically used in forms; when used with the Elastic Forms SuperObject, they can grow or shrink, and can select color depth automatically to match the user’s display.

Developers’ information ships on a separate CD-ROM and is a necessary adjunct to the skimpy standard documentation. Support, mostly by E-mail (support@provue.com), is expert and prompt, but if you need to call to ask, “What’s a field?” this is not the right product for you.

The Last Word Panorama is an ideal tool for rapidly prototyping and deploying small- and medium-size databases with a full Mac interface. It’s a bit idiosyncratic, but intrepid database programmers can get fast, high-quality results.—CHARLES SEITER

RATING: ★★★★★/7.1 **PROS:** Many conveniences for developers; great performance for small-business databases. **CONS:** Not useful for large enterprise-wide databases. **COMPANY:** ProVue Development (714/841-7779). **LIST PRICE:** \$395.

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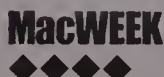
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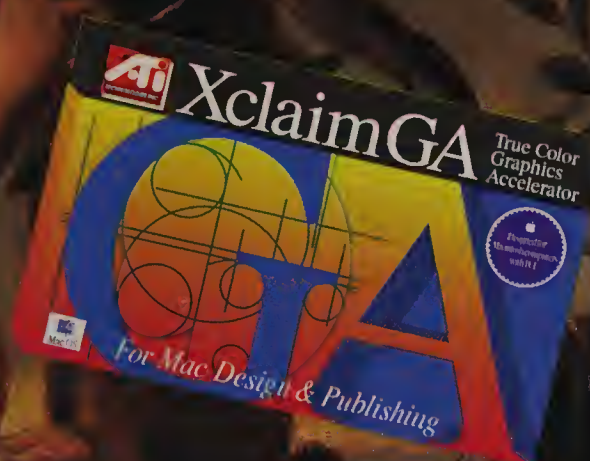
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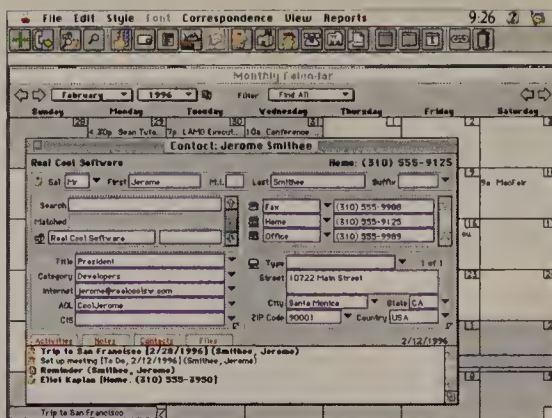
Full Contact 3.0

RESURRECTED PIM HAS BEEN IMPROVED—BUT NOT ENOUGH

FIT SOFTWARE WENT OUT OF business last year, but its personal information manager (PIM) didn't follow the company into oblivion: Pitch Software bought the rights to Full Contact and recently released a new version. While the upgrade improves on the original in several areas, it still comes up short in today's competitive PIM arena.

Full Contact 3.0 is unique in that it uses a powerful database engine to link and maintain the relationships among names, addresses, events, and to-do items. This smart linking lets you quickly list a company's employees, for example, or keep a detailed history of all the meetings, phone calls, and letters (via a built-in word processor with mail merge) pertaining to an individual. You can create a linked record from within another record, or link existing records by dragging and dropping one onto another.

I like many of this version's improvements: it's faster (3.0 is Power Mac native); it has a new global search, a better tool bar, and smarter linking; and it lets users share



It's All Linked With the monthly calendar as a backdrop, a Contact record shows linked events and related people along with the usual name-and-number data.

calendars. If you're using System 7.5, you can drag and drop a file (such as a spreadsheet or memo) from the desktop onto a Full Contact record; to open the file, you simply double-click on the icon that appears. This feature lets you group all the documents for a particular client in one place, for example. And if you're switching from another PIM, you won't be disappointed—Full Contact's importing is the smoothest I've seen. I imported Now Contact, Now Up-to-Date, and Claris Organizer files with no problem.

Record linking may be easy, but Full Contact makes you jump hurdles to do

more basic tasks. For example, the data entry forms are poorly laid out, forcing you to tab through less-important fields to enter vital data. Recurring events aren't linked; each appears separately, and changing one event doesn't affect the others. Unlike other PIMs, Full Contact doesn't offer a permanent menu that lets you enter data regardless of the program you're using—you have to have Full Contact open. Finally, printed reports aren't customizable enough, and you're limited to six canned reports.

The Last Word Full Contact was originally designed to help salespeople keep track of their time and customers. Its linked-data-at-a-glance structure works well for people who live and die by their daily planners, but unless you're willing to devote some time to learning and using Full Contact—and are willing to forgive its interface problems—you should look to another PIM for your contact- and time-management needs.—TOM NEGRINO

RATING: ★★/5.2 **PROS:** Easy record linking; improved performance. **CONS:** No Finder menu for easy accessibility; recurring events aren't linked; cumbersome data entry. **COMPANY:** Pitch Software (408/374-5504, pitchsoft@aol.com). **LIST PRICE:** \$199.

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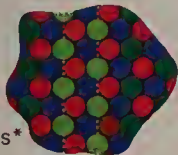
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NetMeter 1.0

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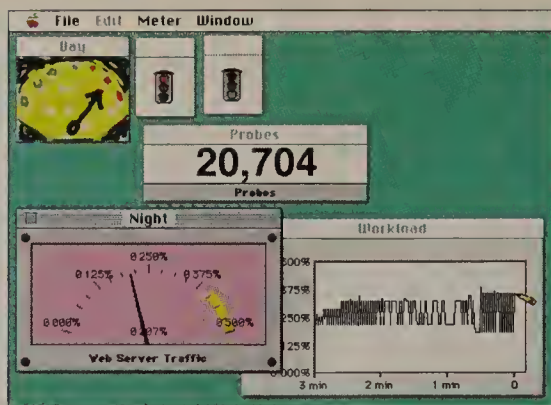
AG GROUP'S NETMETER IS AN ingenious tool that keeps tabs on your Ethernet network and alerts you to problems. Best of all, NetMeter capitalizes on the Mac's audiovisual capabilities to let you see and hear the data.

NetMeter comes with AG Group's Satellite data-collection software for one network segment. There's no printed manual, but everything you need is well documented in Portable Document Format (PDF) and Apple Guide built-in documentation.

NetMeter and Satellite can run on one Mac. Satellite takes over the Ethernet port, observing network traffic and archiving statistical "snapshots" of it to disk. In contrast to AG Group's Skyline network-monitoring tool, which gathers from Satellite historical network data you can view over time, NetMeter shows what is happening now.

If you have multiple Ethernet segments, you can run a Satellite (prices start at \$300) on each segment. Each Satellite requires an Ethernet interface for data collection and another AppleTalk-capable interface to communicate with NetMeter.

You can create an unlimited number of



Multiple Views NetMeter lets you construct different ways to view network performance.

meters for monitoring data from a Satellite. You can choose from five visual-meter formats (needle, strip chart, text, traffic light, and QuickTime movie) and three audio formats (music, phrase, and speech). You then optionally set the units of measure (packets, bytes, or bits per second; or percent utilization), meter scale, overload threshold, and on-screen label. You can also filter the traffic monitored to include only select protocols, nodes, or conversations.

This fine-grained control lets you set up meters to monitor a particular network hot spot. For example, I set up a NetMeter strip chart to track the outgoing TCP/IP traffic from my Web server, and a voice meter to announce incoming FTP traffic.

NetMeter lets you save the meter definitions as individual files for easy reuse.

The audio meters report data by changing the pitch of a synthesized musical instrument (based on QuickTime sounds), playing a prerecorded phrase at a certain threshold, or speaking the numeric value at preset intervals. The movie meter lets you use any QuickTime movie as the visual display. The meter moves to different parts of a movie to reflect the traffic it's tracking.

Not all meter types support on-screen labels, a real annoyance if, for example, you have several traffic-light meters on screen and need to know what is causing one of them to go red. Also, the windows are not resizable, and some meters are so small that you can't view them from a distance.

The Last Word For monitoring several network-performance variables simultaneously, NetMeter works great. If you need a third eye (or ear) on your network's health, NetMeter is it.—MEL BECKMAN

RATING: ★★★★★/7.3 **PROS:** Assortment of display options; filters multiple protocols; traffic filtering; remote-segment monitoring. **CONS:** No labeling for some meters; meters not resizable. **COMPANY:** AG Group (510/937-7900, info@aggroup.com). **LIST PRICE:** \$395.

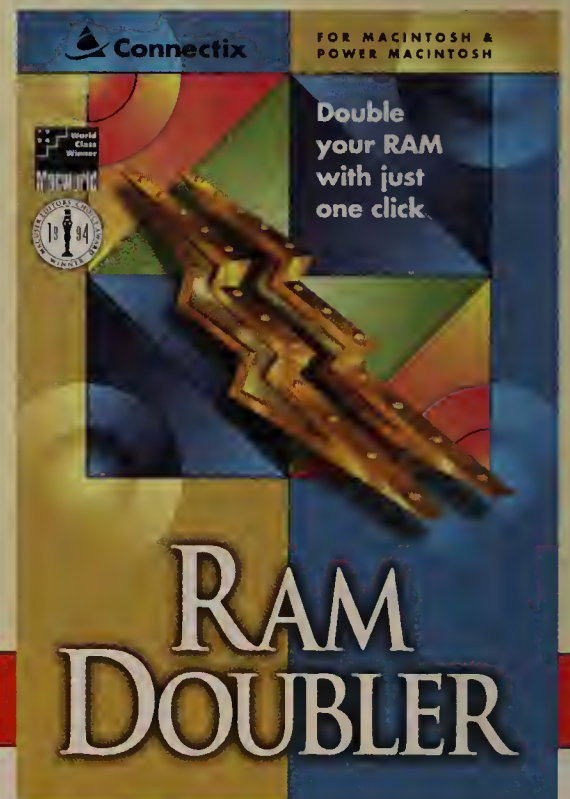
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Captivate 4.5

SCREEN GRABBER FUMBLES BUT SURVIVES

CONSIDERING THE TINY AUDIENCE for screen-capture programs (manual, magazine, and book writers), it's surprising that software catalogs were crawling with them only two years ago. What's *not* surprising is that only one is still commercially available. This surviving program, Captivate (formerly known as Capture), is actually three utilities: a screen grabber, a graphics viewer, and a multimedia scrapbook and organizer.

Captivate Select, the screen-capture centerpiece of the suite, will thrill anyone who has never used a screen grabber before. A keystroke turns the cursor into crosshairs that you can drag across any portion of the screen to capture it, even if a menu was pulled down when you pressed the keys. Captivate instantly converts the selected area into a graphics file—a TIFF, GIF, MacPaint, or PICT file, or a new entry in the Scrapbook or Clipboard. For anyone who finds that the Mac's built-in screen-capture feature demands too much cropping and resaving, such a utility is mandatory.

The accompanying Captivate View program lets you view, rotate, resize, and



Captured... But Not by Cruella Captivate's Delay option captures a screen saver in action.

crop the results. And with Captivate Store, you can paste graphics—or text, a QuickTime movie, or sound—into any program that accepts them.

Unfortunately, anyone who *has* used a screen grabber will notice that Captivate doesn't streamline the task as much as it could. For example, consider the challenge of capturing a pulled-down menu. Captivate's former rivals could neatly grab only the menu itself, automatically cropping out the background and the neighboring menu titles. (Even the shareware program Flash-It can do that.) Captivate, on the other hand, makes you enclose the menu manually, then manually edit out background junk. The same problem applies to dialog boxes and windows. Worse, the View program has no eraser tool; to delete unwanted

ed menu titles from a menu shot, you must use a program like Adobe Photoshop.

Another disappointment is Captivate's control-panel incarnation. While the program offers many useful options for manipulating a captured image, each requires a trip to the control panel. Other screen grabbers offered these options the moment you took the screen shot.

The Last Word In the basics department, Captivate surpasses even its deceased rivals: it's more stable and nearly as flexible. And Captivate alone can create TIFF files—indispensable for professional work. In other areas, Captivate makes you wish you had been at the feature-list meeting. I admire Mainstay for continuing to improve its program in spite of a minuscule market. But unless you need to create TIFF files, you may find the \$15 Flash-It a more convenient—and captivating—grabber.—DAVID POGUE

RATING: ★★★/5.7 **PROS:** Captures pulled-down menus, dialog boxes, even screen savers; saves images in many formats; extremely reliable. **CONS:** Can't automatically crop menus or windows; requires control-panel visit to save settings; viewing utility has no eraser. **COMPANY:** Mainstay (805/484-9400, mainstay1@aol.com). **LIST PRICE:** \$89.95.

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Life's Greatest Mysteries

CD-ROM EXPLAINS IMPONDERABLES FOR THE MEDICALLY CURIOUS

S EARCHING IN VAIN FOR ANSWERS to perplexing questions like why toast always falls with the buttered side down? I can't suggest any software that can help you out there, but if you're interested in learning more about how the human mind and body work, then you may find Life's Greatest Mysteries well worth a few hours of your time.

Life's Greatest Mysteries is the third in a series of home medical CD-ROMs from A.D.A.M. Software, which also produces anatomy programs for medical professionals. Life's Greatest Mysteries offers animated explanations for questions about human biology in four subject areas: mind, body, sickness, and curiosities.

The presentation is hosted by Bob Winkle, an actor with a British accent. Bob appears in or narrates most of the animations, so if you find him annoying, you'll probably lose patience fast. (I didn't mind him most of the time.)

After the preamble, you get to choose which topics to look at by clicking on a table of contents or selecting from a scrolling list. The subjects range from the mundane



Once Bitten . . . This QuickTime movie explains what happens when a person who's allergic to bee stings gets stung.

("Why does your leg fall asleep?") to the macabre ("Can the brain survive without the heart?"). Parents who want to protect their kids from gory or sexually explicit material can block objectionable subject areas with a password.

As in A.D.A.M.'s other educational CD-ROMs, the artwork—which depicts everything from individual cells to the whole body—is top-notch (see "Once Bitten . . ."). The narration, music, and sound

effects are equally well done, and they complement the pictures and animations nicely. Life's Greatest Mysteries also uses a handful of simple puzzles and quizzes to drive home some points; for example, the section on recall incorporates a simple game with colors and sounds that illustrates how short-term memory works.

The disc also includes a handy technical dictionary that displays brief pop-up definitions when you click on an item. You can also look up summaries of any of the 41 topics, although you have to use SimpleText or a word processor to put them on paper—the program doesn't support printing.

The Last Word Life's Greatest Mysteries isn't quite as cohesive or compelling as A.D.A.M. The Inside Story (*Reviews*, March 1995), but it's still entertaining and educational. Aside from the lack of support for printing, my only other gripe is that there's no way to make the program play several animations in a row, but those are minor concerns.—FRANKLIN TESSLER, M.D.

RATING: ★★ ★/5.8 **PROS:** Excellent artwork and sound; educational and entertaining. **CONS:** No way to play a series of animations; no support for printing. **COMPANY:** A.D.A.M. Software (770/980-0888). **LIST PRICE:** \$39.95.

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Smart One 2834VLXMac

VOICE MODEM IS NOT A SMART CHOICE

NOW THAT FAX MODEMS ARE commonplace, Best Data Products has tried to distinguish its Smart One 2834VLXMac 28.8 modem by giving it voice mail capabilities as well. Unfortunately, the voice software just doesn't work, and the fax software is old-fashioned and uninspired.

Testing got off to an inauspicious start when I was unable to install the SuperVoice fax and voice software—it turned out the disk that came with the unit was damaged. After receiving a replacement disk, I installed SuperVoice easily. That's when my troubles *really* began.

First up in the hall of shame is the fax software, the worst I've seen for the Mac since 1988. Here's the way faxing should be on a Mac, as exemplified by Global Village, Delrina, and others: the software provides a fax print driver that appears in the Chooser. Normally you have a printer selected; to send a fax, you hold down a key that temporarily selects the fax driver. Next you choose the Fax command from the File menu, choose the recipient in the dialog box that appears, and click on the Fax button to



GIBSON

send the document. When you receive a fax, an extension that watches the modem port for incoming calls handles it automatically.

In contrast, SuperVoice sends you to the Chooser every time you want to send a fax. After choosing Print, you switch to the SuperVoice application to specify the destination and send the fax. Want to receive a fax? Plan to have SuperVoice running in the background constantly. You'll also miss out on common fax features such as address groups, archiving, and call grouping.

SuperVoice offers a constellation of other annoyances: it uses an odd interface, you can't import fax numbers into the

phone book, and its error messages often turn out to be incorrect. But as poorly implemented as the fax features are, at least they're usable; I couldn't get the voice mail to work at all. I was unable to record greetings or messages, play them back, or set up voice mailboxes. Worst of all, SuperVoice was prone to quitting unexpectedly on my Power Computing Power 100.

I tried unsuccessfully to get help from Best Data's tech support; the company had to refer me to SuperVoice's vendor for help with the software. After several hours of calling the support line, I got through to a technician who was unfamiliar with the Mac version of SuperVoice. He promised to have the "Mac guy" call me back. I'm still waiting.

The Last Word The Smart One 2834VLX wasn't *all* bad; it worked fine as a data modem, making fast connections to online services and Internet providers. But if you're thinking about using it for faxing, good luck . . . and don't retire your answering machine just yet.—TOM NEGRINO

RATING: ★/2.6 **PROS:** Works fine as a data modem. **CONS:** Voice and fax software is buggy; voice functions don't work; inadequate support. **COMPANY:** Best Data Products (818/773-9600, admin@bestdata.com). **LIST PRICE:** \$269.

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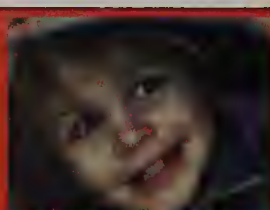
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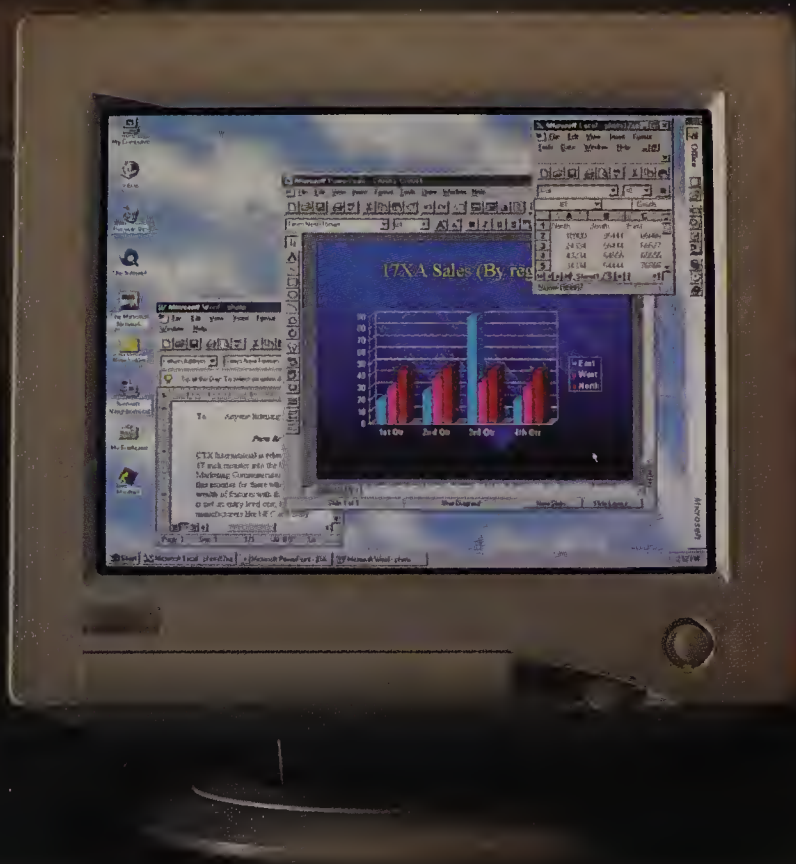
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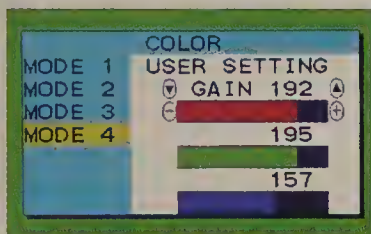
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1765GMe Monitor
June 1995



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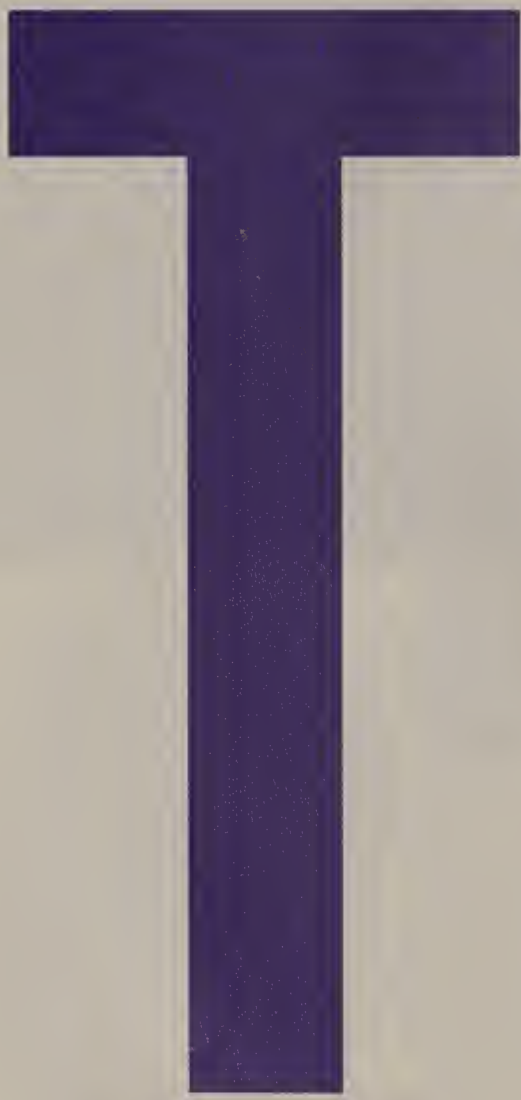
Circle 102 on reader service card

Ultimate Imaging

The Software and Hardware

You Really Need to Create Fantastic Images

by Deke McClelland



THE WORD ON THE STREET IS THAT A

major update of Adobe Photoshop is due out this fall. It may provide faster image processing, improved type capabilities,

multiple undos, or support for spot-color separations. Or it may provide none of these things and surprise us with other enhancements. But whatever the new version does, we can safely reach two basic conclusions about both the present condition and the short-term future of Macintosh imaging: every serious publishing professional needs to own Photoshop, and Photoshop by itself is not enough.

Macworld has assembled several different software and hardware alternatives that expand Photoshop's native capabilities or extend into areas that Photoshop simply doesn't touch. First we examine Live Picture (now distributed by Live Picture), Macromedia xRes, and Fractal Design Painter. Next we tackle the world of Photoshop plug-ins and companion utilities, and assemble what we consider to be the must-buy collection. Then we share an assortment of largely unknown, undocumented, and essential Photoshop secrets. And for the latest word on the fastest CPU, consult our review of the newest Power Mac systems from DayStar, Power Computing, Umax, and Apple. Finally, we assess the merits of several brands of 64- and 128-bit PCI video cards.

You Can't Please All of the Artists Any of the Time

A lot has changed since the last significant Photoshop upgrade. Since Photoshop 3.0 shipped, Live Picture and Painter have both upgraded twice, xRes has debuted and upgraded to 2.0, and the World Wide Web has breathed new life into 72-pixels-per-inch (ppi) images. It's a testimony to Photoshop's core flexibility and functionality that it still dominates. In fact, by virtue of its superior selection, color-correction, filtering, layering, and printing capabilities, Photoshop remains the single most significant and capable image editor for the Mac. But the program's imperfections and omissions leave some artists searching for alternatives.

That's where Live Picture, xRes, and Painter come in. All three programs seek to share Photoshop's popularity by identifying and addressing the program's key weaknesses. (This is less true of Painter, which is the foremost Macintosh paint program in its own right. Even so, much of Painter targets image editors.) Judging by the most ballyhooed capabilities of Live Picture, xRes, and Painter, Photoshop's three most significant areas of weakness are as follows:

Single Undo Photoshop is one of the few publishing programs on the planet that offers just a single-level Undo command. Although there are several ways to restore bits and pieces of images saved to disk—provided you don't resize or crop the image—you can reverse one and only one operation.



Essential Add-Ons

No Photoshop User Should Be Without These Gems

For many artists, Adobe Photoshop is more important than the operating system. Be honest—if Photoshop were available only on Windows, wouldn't you consider hocking your Power Mac and getting a Pentium? With so many computer artists unified around this single application, it's not surprising that software exists solely to satisfy their needs.

After gathering as many Photoshop plug-ins and support utilities as I could find, I selected the ones that every Photoshop user ought to own. I've organized my selections in order of importance, so if money is tight, you can add one product at a time. (No program costs more than \$400.) I for one would sooner part with my trusty old IICI than take any of these treasures off my hard drive.

DeBabelizer Bridges the Gaps

Ask a multimedia professional if he or she would prefer to give up Photoshop

or DeBabelizer, and the most likely response is, "Don't you *dare* touch either." Format conversion, palette reduction, batch processing, and background removal are all handled better by DeBabelizer than by any other tool. If you produce graphics for CD-ROMs or the Web, DeBabelizer may be your most important purchase.

DeBabelizer is the absolute master of color reduction. No other program does a better job of maintaining good color balance and soft transitions. The four figures at bottom left compare an image reduced to 16 colors inside both Photoshop (left) and DeBabelizer (right). The top images use dithering, and the lower ones do not. (Non-dithered artwork typically compresses better, resulting in small files for quicker online browsing.) DeBabelizer maintains smooth transitions in the sky, even without dithering. In Photoshop, you see white clouds, blue sky, and nary a transitional color between them.

The program is at times excessively complicated—the menu and option names are obtuse—but the manual is comprehensive and well organized. And I rarely find an image I can't open in DeBabelizer and save to a different format. If I had to create all my graphics with Photoshop and only one other tool, it would be DeBabelizer.

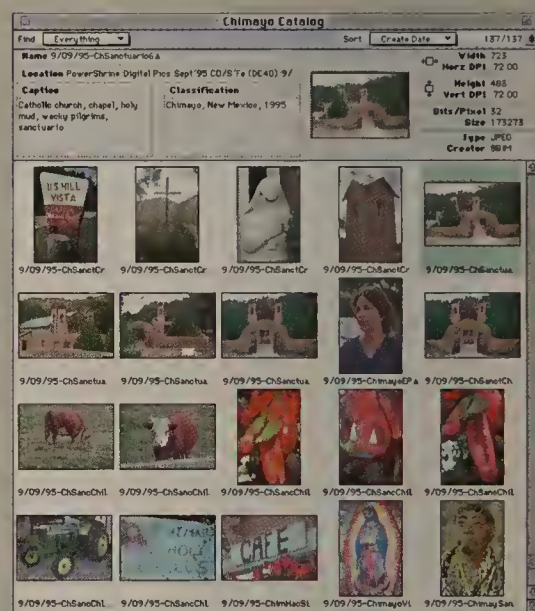
DeBabelizer 1.6.5 Equilibrium (415/332-4343), \$399.

PhotoMill Catalogs Images

It's easy to amass a large collection of digital artwork and photography, particularly if you own a digital camera. But sifting through all the files or viewing thumbnails inside Photoshop's Open dialog box is time-consuming. The most popular cataloger is Adobe Fetch (see "The Right Tools for the Job," *Macworld*, April 1996). But Fetch doesn't support drag and drop and lacks support for many new formats, including interlaced GIF files. I prefer Pacif-

ic Coast Software's PhotoMill. Though skimpily documented, PhotoMill is easier to use than Fetch and provides all the features most artists need.

Unlike Fetch, PhotoMill loads thumbnails in the background. You can drag a thumbnail from the PhotoMill catalog into Photoshop, QuarkXPress, Adobe PageMill, or any other program that supports Macintosh drag and drop. You can record sound clips to go with a thumbnail and view a slide show of full-size images accompanied by sound.



PhotoMill can't accommodate Photoshop-format files, and its keyword capabilities are not as robust as Fetch's. Yet, while Fetch seems to be in a temporary holding pattern, PhotoMill is keeping pace with new technology.

PhotoMill 1.5.3 Pacific Coast Software (619/675-1106), \$99.95.

TextureScape Creates Seamless Patterns

Textures are great for establishing neutral overlays and realistic backgrounds. Photoshop lets you generate repeating patterns, but it doesn't provide an automated way to eliminate the seams between tiles. Adobe TextureMaker, Alien Skin Textureshop, and Xaos Terrazzo are notable text-creation programs, but the best of the bunch is Specular TextureScape 2.0.

TextureScape is the only one that lets you design object-oriented embossed patterns. You draw shapes, layer them, assign colors and edge bevels, and light the shapes, all using a compact collection of straightforward controls. Tex-



tureScape guarantees seamless patterning by repeating the shapes at regular intervals, regardless of how you move or transform them.

TextureScape's palette of drawing tools lets you create shapes directly in the program. But most folks will still prefer to draw their original shapes in Adobe Illustrator or Macromedia FreeHand. When you complete the pattern, you can render it to pixels and then open it inside Photoshop.

TextureScape 2.0 Specular International (413/253-3100), \$199.

TypeCaster Plugs Into 3-D Text

If you want to create 3-D type directly inside Photoshop, the best solution is Xaos Tools' TypeCaster. You simply open a TypeCaster dialog box, enter some text, select a font, and modify the type in 3-D space. You can rotate, scale, and adjust the depth of the extrusion. You can also apply and modify surface textures on the face, bevel, and extruded sides of the type. Finally, you can assign and position light sources using a separate dialog box.

Be sure to apply the text to an independent layer inside Photoshop. Because TypeCaster doesn't support custom kerning, you'll need to adjust the type manually. In the example below,



the *c* is too close to the *m*. So I had to select the character and nudge it left toward the *A* for the finished logo. TypeCaster isn't perfect—live previews, individual character positioning, and letter warping should be added—but it's a strong first version and an excellent addition to Photoshop.

TypeCaster 1.0 Xaos Tools (415/487-7000), \$199.

The Black Box, Paint Alchemy, and Kai's Power Tools

Selecting one collection of special-effects plug-ins is difficult. My three favorites are Alien Skin's The Black Box 2, Xaos's Paint Alchemy 2, and Kai's Power Tools 3 (KPT 3) from MetaTools. Of the three, The Black Box is the least expensive and the most practical. It provides access to a number of beveling and distortion effects, including a unidirectional motion blur and an excellent glass refraction filter. Even the Drop Shadow and Glow filters are useful, though most first-year Photoshop users know how to create these effects. The Black Box lets you do all these effects in one step, and you can save the settings and reapply them later. For my money, The Black Box is the most solid special-effects collection out there.

Paint Alchemy and KPT 3 are special-effects laboratories—a tad opaque if you're on a deadline, but lots of fun. Paint Alchemy is a single plug-in that automatically smears the colors in a selection with a series of brushstrokes. You can load a gray-scale PICT file to use as a brush and then modulate the size, angle, and opacity of the brushstrokes to create an infinite range of variations. My only complaint is that Xaos has doubled the list price of Paint Alchemy since the initial release without doubling its capabilities.

KPT 3 is an artistic adventure down the White Rabbit's hole. Some folks find its otherworldly options and controls inspiring; others find that the interface impedes their progress. But however you judge its interface, KPT 3 is a powerful collection of plug-ins. The Gradient Designer filter lets you create an array of gradations unmatched by any other software. And while the randomized Texture Explorer doesn't match TextureScape for precision control, it generates some intriguing infinite patterns. Other filters bolster Photoshop's native capabilities by supplying special blurring, edge-tracing, and noise functions.

The Black Box 2.0 Alien Skin Software (919/832-4124), \$119.

Paint Alchemy 2.0 Xaos Tools (415/487-7000), \$199.

Kai's Power Tools 3.0.2 MetaTools (805/566-6200), \$199.

Fixed Resolution All images, text, and brushstrokes added to a Photoshop composition must conform to uniform resolution. Worse yet, a transformation applied in one step cannot be reversed or modified a few steps later without degrading the image.

Sluggish Speed Photoshop slows down in relation to the size and resolution of the image. Even on a fast machine, you have to be patient to edit a 20MB image and downright stoic to work on a 100MB image. More RAM, acceleration boards, and faster Macs all help, but a lot of money doesn't guarantee a lot of gain (see "Photoshop at Warp Speed," elsewhere in this section).

We evaluated Live Picture 2.5, xRes 2.0, and Painter 4.0 based on their performance in each of these areas. The results are both surprising and moderately disappointing. Live Picture remains strong in all three areas, though little has changed since its initial U.S. release. xRes 2.0 represents a marked improvement over the previous version, but it is still the quirkiest of the bunch. And Painter—a program that seems far removed from the day-to-day issues of workflow and productivity—fares better than you might expect.

Unleash the Undo

Painter offers up to 32 levels of undo, xRes offers 20, and—depending on whom you talk to—Live Picture offers an unlimited number or just 1. When you choose the Undo command in Live Picture, it changes to Redo. This means you can backstep 1 operation, and no farther. Strictly speaking, Live Picture has 1 Undo. But Live Picture representatives maintain that the program offers something better. Because Live Picture tracks every brushstroke and edit as a mathematical path—much like those in Macromedia FreeHand or Adobe Illustrator—you can go back and manipulate the brushstroke long after you create it. This is clearly a useful feature, but it neither replaces nor eliminates the need for multiple undos. For example, if you delete one layer and then rotate another, the first layer is lost just as surely as it is in Photoshop. The irony is that Live Picture's core technology would support multiple undos with less overhead than Photoshop or any other competitor.

If you thought that sounded a bit

Photoshop Secrets

Macworld's Expert

Shares His Top Techniques

No matter if you're an imaging professional or an amateur photographer, you probably use Adobe Photoshop so much that you think you've pretty well mastered every detail of the program. The following are a few favorite tips and techniques that I've discovered in the last year or so. Many are undocumented, and all are gems. (For more tips, see <http://www.macworld.com>.)

Navigation Techniques

No matter how you cut it, navigation is an inconvenience. Photoshop provides a wealth of hidden tricks.

Maximum Zoom Pressing ⌘-plus (+) and ⌘-minus (-) zoom in and out, respectively. But did you know that you can zoom all the way in (a 16:1 screen-to-image pixel ratio) or all the way out (a 1:16 ratio) by pressing ⌘-option-plus and ⌘-option-minus? Double-click on the Zoom Tool icon to return to 1:1.

Parting the Palettes If you don't want to hide a palette entirely, you can option-click on its title bar to hide everything but the title bar and panel tabs, or click on a title bar to snap the palette to the nearest edge of the screen, away from the image window's center. This also works on the toolbox.

Return for Options Never double-click on a tool icon to display the Options palette. It's easier to simply press the return key when the tool is selected. This also activates the first option-box value. Then you can enter a new value and press return to apply it.

Number Nudge You can incrementally adjust a highlighted option-box value in any palette or dialog box by pressing an arrow key. Press the up or

down arrow to raise or lower the value by 1; press shift-up or shift-down to raise or lower the value by 10. Photoshop even accounts for the range of an option. In the Unsharp Mask dialog box, for example, pressing an arrow key changes the Amount value by 1, but it nudges the Radius value a scant 0.1.

Color Tricks

Whether your color is meant for the screen or the press, the following tips should come in handy.

Colorful Downsizing In Web publishing, lower bit depths translate to



quicker uploads. If you use the Indexed Color command to reduce the color palette to 4-bit (16 colors), you can reduce the upload time by 50 percent. The problem is that a 4-bit palette may sacrifice key colors in your image, as in the emu on the upper right.

The trick is to exaggerate the colors you want to retain. First expand the size of the image using the Canvas Size command to permit an area for scratch colors. Then clone the colorful areas and enlarge them in the scratch area, as I did in the left side of the bottom image. Then when you switch to a 4-bit palette, the color spans a wider gamut.

Correction Coda The color-correction dialog boxes reset each time you

bring them up on screen. But if you want to duplicate the last set of corrections you applied, press the option key when choosing the color-correction command. Or press option along with the standard keyboard shortcut, as in ⌘-option-L for Levels.

CMYK Picker You can choose the CMYK Preview and Gamut Warning commands while inside Photoshop's Color Picker dialog box. CMYK Preview shows how colors will appear in the CMYK color space; Gamut Warning coats all colors that fall outside the CMYK gamut with gray. Gamut Warning is especially useful for masking out colors that won't print.

Selection Secrets

Photoshop's selection tools are the most plentiful and versatile around, but they aren't always obvious.

Add and Subtract Everyone knows that you add to a selection with the shift key and subtract with the ⌘ key. But did you know that you can press shift and choose the Color Range command to add to a selection, press ⌘ and choose Color Range to subtract, and use shift-⌘ and Color Range to find the intersection of selections?

Floating Options Pressing ⌘-J either clones and floats a selection or drops a floater. But add the option key and things change: ⌘-option-J floats a selection without cloning, leaving a hole behind the floater. If the selection is already floating, ⌘-option-J drops a clone and leaves the floater intact. And, don't forget, you can drop a specific portion of a floater by ⌘-dragging around it with the type tool.

Transforming a Selection To transform an image without choosing the selection, switch to Quick Mask mode (press Q), then perform the transformation, and switch back out (press Q again). For example, when you switch to the Quick Mask mode and apply Image Size, from the Image menu, Photoshop scales both the image and the selection simultaneously.

Transforming a Path Photoshop also transforms paths with an image. But how do you transform a path independently of an image? First duplicate the image by option-choosing Duplicate from the Image menu, then apply

the desired transformation. Use the arrow tool to drag and drop the transformed path into the original image window. (Option-click to select the entire path and *then* drag.)

A GIF for Any Background

Photoshop 3.0.5's new GIF89a Export filter allows you to create interlaced GIF images with transparent pixels. Sadly, the GIF format offers no provision for translucent pixels, which makes creating soft edges difficult. The trick is to create random pixel patterns that fade into any background.

First select the portion of the original RGB image that you want to remain opaque. Then feather the selection. Invert the selection (Select menu's Inverse command) to select the area that will become transparent, and float the selection (⌘-J). Fill the floating selection with some garish color that is absent from the rest of the image, such as red in the tapir image. Then select the Dissolve option from the pop-up menu in the Layers palette.

Convert the image to 256 or fewer colors. Then choose GIF89a Export and click on the garish color in the



image preview to make all occurrences of that color transparent. If a few of the garish pixels remain opaque, zoom in and click on them as well. The pixels from the image will now dissipate into the background, regardless of what background color the person viewing your Web page uses.



Every Old Pixel Is New Again These three images show the result of taking an image, reducing it to 25 percent of its original size, and then enlarging it 400 percent inside Photoshop. The final image suffers terribly because Photoshop throws away most of the pixels, then tries to generate new pixels based on the few that are left. By contrast, Live Picture and xRes return to the original image each time you make changes. If you reduced the image to 25 percent, you'd get the middle image. But when you enlarged it 400 percent, you'd return to the image on the left, with every single pixel intact.

complicated, it's even more complicated in xRes. The Undo command in xRes distinguishes between two varieties of operations—global operations include deletions and transformations, while local operations comprise brushstrokes, color corrections, and filters. You can undo up to 20 local operations per layer, but just 1 global operation. Furthermore, a local operation eclipses a global undo, meaning that if you apply a filter, rotate a layer, and then apply a brushstroke, you can undo the brushstroke and the filter, but not the rotation (which is global). Even more unsettling, xRes requires a huge Undo buffer in memory. If you want 20 undos, the program demands a free space on the scratch disk equal to 20 times the size of the image. That's 2GB for a 100MB image. And a bug prevents you from lowering the number of undos to free up virtual memory on a secondary scratch disk (Macromedia promises a fix in an upcoming release). Although xRes should be applauded for permitting multiple undos per layer, I think a broader interpretation would enhance the feature's appeal and potential.

Painter provides the best undo system. There is no distinction between one kind of operation and another, and

Painter's memory management is also better. Like Photoshop, Painter segments the image into square tiles. When you paint across the image or apply a command, Painter saves the affected tiles—not the entire image or layer—to the Undo buffer. This still takes up a fair amount of room on disk, but Painter manages to keep things efficient.

Undo Champ: Painter 4.0

Imagine There's No Pixels

Photoshop and Painter subsist on pixels the way a blue whale subsists on plankton. But xRes and Live Picture take a different approach. xRes is essentially a pixel-based program, but it permits you to transform images and type without inflicting incremental damage. Live Picture is an object-oriented program, which means that it allows both resolution-independent brushstrokes and multiple image resolutions within a single composition.

In xRes, every layer in a composition has to conform to the same resolution, just as in Photoshop and Painter. But as long as you are working in the so-called xRes mode, the program invariably consults the original image when applying transformations. This means you can scale a layer to 25 percent and then scale it back to its original dimensions to restore the same pixels you started with. In Photoshop, each resizing throws away the old pixels and generates a new set of pixels, gradually degrading the image quality (see "Every Old Pixel Is New Again"). In xRes, you can scale and rotate images as much as you want without damaging your image. Similarly, when you enlarge type, xRes redraws the letters based on the printer-font definition, thus ensuring

Image-Editor Roundup

	Photoshop 3.0.5	Live Picture 2.5	xRes 2.0	Painter 4.0
Company	Adobe Systems	Live Picture	Macromedia	Fractal Design
Phone	415/961-4400	408/464-5988	415/252-2000	408/688-5300
List price	\$895	\$995	\$799	\$549
Star rating ^A	★★★★/8.5	★★★★/7.2	★★★/6.3	★★★★/8.9
Minimum/suggested RAM partition (in kilobytes) ^B	10,368/13,440	20,448/26,592	14,109/18,109	14,885/14,885
Features				
Pyramid file format	○	●	●	● ^C
Interlaced screen redraw	○	●	○ ^D	○
Opens multiple documents	●	○	●	●
Clipboard support	●	○	●	●
Drag and drop between open images	●	○	●	○
Numerical sharpening and blurring	●	○	●	●
Maximum number of undos	1	1	20 ^D	32
Unlimited transformations without image degradation	○	●	●	○
Resolution-independent brushstrokes	○	●	○	○
Traditional-media brushes and paper textures	○	○	●	●
Direct access to pixels	●	○	●	●
Blend modes	●	○	●	●
Scratch disk required	●	○	●	●
File formats (other than native)	EPS, GIF89a, JPEG, Photo CD, PICT, TIFF	JPEG ^E , Photo CD, TIFF	EPS ^F , GIF89a, Photo CD, PICT, PNG, Progressive JPEG, TIFF	EPS ^F , GIF89a, JPEG, PICT, TIFF
Batch processes format conversions	○	●	●	○
Opens Photoshop 3 compositions with layers intact	●	○	○	●

● = yes; ○ = no. ^A Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ^B On a Power Macintosh; minimum 680X0 partition may be smaller. ^C Not native format. ^D 20 local undos per layer, 1 global undo. ^E Can save IVUE files with JPEG compression. ^F Only saves EPS; cannot rasterize.

the best possible resolution. It's a level of flexibility that's simply absent in Photoshop 3.0.5.

Live Picture doesn't give a passing thought to pixels during the entire editing process. Live Picture is more like Free-Hand or QuarkXPress than Photoshop in this regard. Each image is a self-contained object with its own resolution. Each letter of text is a mathematical path that you can scale and distort, as in a draw program. The brushstrokes and edits are also paths, so you can erase your edits anytime. I've talked to artists who are under the illusion that there's no such thing as resolution in Live Picture—the program somehow describes the images using pure math. But Live Picture is not that elaborate; it's merely an object-oriented image handler. The program renders images at their original resolution and renders all type and brushstrokes at the highest resolution possible. The downside is that you can't access individual pixels the way you can in a true bitmap program like Photoshop or Painter. For example, Photoshop lets you clone bits

and pieces of an image to extend a background or cover up imperfections, while Live Picture requires you to create a different layer for each new clone. But if your primary interest is compositing images, Live Picture's approach is fast and flexible.

Resolution-Independence Champ: Live Picture 2.5

Delayed Satisfaction

Pixel editing is a tremendous chore. Insofar as software is concerned, every pixel is a 24-digit series of 0's and 1's, and a typical 20MB image contains millions of these numbers. Certainly, faster CPUs and coprocessors help, but as any middle manager will tell you, the surest way to expedite a job is to avoid doing it in the first place. Avoidance is precisely the approach that each of our programs adopts to some extent.

For example, when you apply a blend mode such as Multiply or Screen to a layer in Photoshop, the program calculates the effect of the blend mode on the visible pixels only. If you're zoomed out to the 1:4 view size, say, Photoshop applies

the blend mode to one out of every 16 pixels (4 pixels horizontally by 4 pixels vertically). Painter 4 employs reference floaters, which are screen-resolution proxy layers. They permit you to experiment with a series of transformations and then apply them en masse when you achieve the desired effect.

Both Live Picture and xRes employ special pyramid-style file formats. Live Picture's IVUE format and xRes's LRG format store images several times, at progressively halved resolutions (see "Pyramid Scheme"). The program lifts just the proxy tiles from the file that represent the portion of the image visible on screen. If you want to view the upper-left corner of an image at the 1:4 zoom ratio, for example, the program loads the quarter-resolution tiles from the upper-left corner and ignores all other tiles. The next time you scroll or magnify the image, the program goes back to the LRG or IVUE file, loads different tiles, and reapplies your effects to the new tiles. Both Live Picture and Macromedia chafe at the mere mention of the term *proxy*—they're afraid artists will

equate it with static 72-ppi previews like those in Specular Collage—but the fact is, these tiles act as screen-resolution surrogates. Both programs can swap proxy images in and out at a moment's notice to simulate the appearance of a continuous image.

Live Picture and xRes also use interlacing to speed up screen redraw. When you display a new portion of the composition, the program displays big, chunky pixels to give you an idea of what the image looks like. It then draws in the screen-resolution proxy, so that you see one image pixel for every screen pixel. Live Picture lets you perform new operations without waiting for the screen redraw. xRes ignores you and stalls for a few seconds if you try to switch applications or apply a brushstroke during redraw.

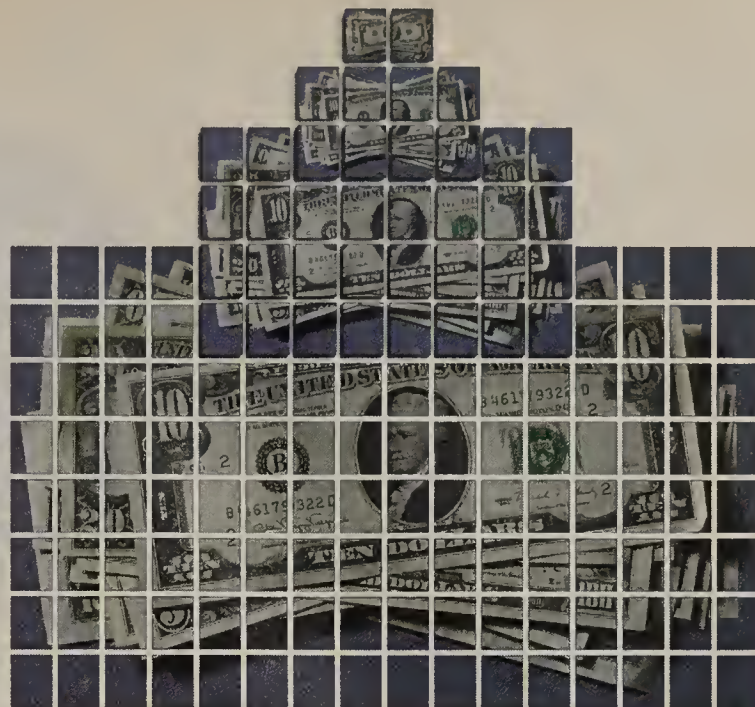
Proxy images permit Live Picture and xRes to work at unparalleled speed. It takes 2 or 3 seconds to load an IVUE or LRG image on screen, regardless of the image size, and transformations and other operations fly by. For example, when editing a 18MB image on a Power Mac 8100 with 40MB of RAM assigned to the application, Live Picture took 5 seconds to rotate the image 37 degrees, xRes took 9 seconds, Photoshop took 54 seconds with the help of a Radius PhotoEngine accelerator card, and Painter lagged behind at 6 minutes, 51 seconds. (Painter's reference floaters are better suited to smaller images and multiple transformations.) Larger images barely slow Live Picture or xRes, whereas Photoshop or Painter slows to a crawl.

Speed Champs: tie, xRes 2.0 and Live Picture 2.5

already own version 2.0 and you're at all cost conscious, IVUE batch processing and support for Photoshop filters might not justify the \$150 upgrade fee—but its core technology remains superior. And if you're as bothered as I am by the program's hefty list of omissions—Live Picture supports neither the Clipboard nor drag and drop, lacks blend modes and numerical focus controls, and lets you edit only the topmost visible layer—the future holds hope: 3.0 is slated to be a major upgrade.

Although xRes 2.0 is a considerable improvement over its inept predecessor, it still leaves room for improvement. The program requires vast expanses of scratch-disk space, whereas Live Picture needs none. If you apply a blend mode to a layer and then convert the color model from RGB to CMYK, the layer inverts. And the type tool still doesn't support automatic kerning. None of these problems is debilitating. If you know Photoshop, the learning curve is slight. Many keyboard tricks are identical. Option-clicking with the lasso tool creates straight-edged selections, for example. If Macromedia would rethink the undo and scratch-disk structure, replace the type tool, and unkink the few remaining quirks, xRes could be a real competitor.

Ironically, the odd man out in this article—Painter 4.0—is the program that



Pyramid Scheme The native file formats for xRes (LRG) and Live Picture (IVUE) repeat an image several times at halved resolutions, so that each repeated image contains a quarter as many pixels as the one before it. (Repeating a quarter of the pixels in an image over and over results in a file size that is 33 percent larger than normal. For example, an 18MB uncompressed TIFF image takes up 24MB in the LRG or IVUE format.) LRG and IVUE also break the image into regular tiles so that the program can load and edit only those tiles visible on screen.

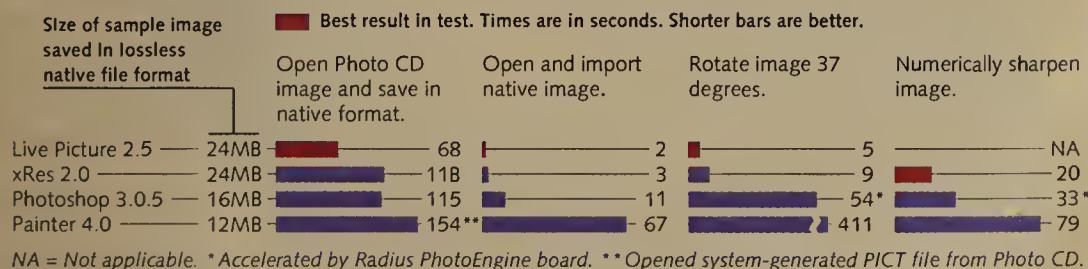
still leaves me scratching my head at times, but it has one huge factor in its favor: about 50 percent of its capabilities are completely absent from any other piece of software on the planet.

The Last Word

If you edit images professionally, or you merely want the best tools money can buy, then Photoshop is a must. By all accounts—including the admissions of its competitors—Photoshop remains the cornerstone of Macintosh graphics applications. But when Photoshop frustrates and disappoints, three applications lie in waiting, eager to smooth out the rough edges. One program, xRes, shows promise that it could eliminate the need for Photoshop in the future. The program is so similar to Photoshop, in fact, that it feels in many respects like an upgrade (albeit an upgrade in need of a few repairs). Alas, xRes's mimicry has its own risks. With a new version of Photoshop due out this year, it may very well be Photoshop that eliminates the need for its challengers. **m**

DEKE MCCLELLAND authored *Macworld Photoshop 3 Bible* (IDG Books Worldwide), which was at last count the number-one title on any graphics or electronic-publishing topic. His newest title, *The Illustrator 6 Book* (Peachpit Press), is due out in June.

Time Tests with 18MB Photo CD Image



Three Programs, Three Directions

If you work with large images—20MB or bigger—then you'd do well to check out Live Picture. The program is superfast and blessed with an object-oriented construction. I must confess disappointment with the most recent update—if you

most artists should own. Though it won only one of the criteria in this article (for its multiple undos) and it's the last program you'd want to use to open a 100MB image, Painter simply can't be beat in the painting and special-effects arenas. Its interface is dense, and its documentation

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The fashion model above was photographed with the PDC-2000 Digital Camera.

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Photoshop at Warp Speed

Superfast Clones Challenge the Power Mac

by Galen Gruman



YOU HAVE YOUR image-editing suite picked out, and you're ready to do some serious work. But now that you've got the most advanced software, your Mac system—whether it's a Quadra 840AV or a Power Mac 8100/80—seems a little dated, especially with new multiprocessing Macs and 150MHz PowerPC 604-based systems available. It's time to take your image-editing studio to the next performance level.

Performance Standouts

As sure as death and taxes, each year's Macs are always noticeably faster than their predecessors. But even with this inevitable progress in mind, the latest generation stands out when it comes to speed. Macworld Lab's benchmarks highlight the dramatic speed improvements using today's Mac systems for a variety of real-world Adobe Photoshop tasks (see "Getting the Photoshop Edge").

Equipped with 150MHz PowerPC 604 CPUs, top-speed Macs today achieve some pretty impressive numbers. They're three times as fast as the Quadra 840AV, the screaming top-of-the-line system just a few years ago, and twice as fast as the original Power Mac speed demon, the 8100/80.

Power Computing already offers a 150MHz system, the PowerWave 604/150, and Umax Computer (510/226-6886) recently announced the 150MHz



KEVIN CANDLAND/SCREEN IMAGES BY DIANE FENSTER

SuperMac S900. Apple should be offering revamped, 150MHz versions of the Power Mac 8500 and 9500 by the time this issue appears (see "New Notebooks, Desktops on Horizon," *News, Macworld*, May 1996). Expect faster Macs to hit the street in early fall, when 200MHz PowerPCs become widely available.

The Multiprocessing Edge More so than improvements in raw chip speeds, multiprocessing systems hold real promise for breakthrough performance. In a nutshell, these Macs use several CPUs working in tandem, processing

transactions faster by splitting the work between the chips. Just as two people can carry more bricks per hour than one person, multiple CPUs can perform more computations than one.

Multiprocessing systems have been around on Unix and PC platforms for a while, so why have they taken so long to debut in the Mac market? Essentially, it boils down to the fact that the standard, out-of-the-box Mac OS doesn't support multiple CPUs.

With Apple's blessing and cooperation, DayStar Digital (770/967-2077)

developed a system extension that lets the Mac OS work with multiple CPUs when you run programs designed for multiprocessing. Capitalizing on this new capability, DayStar offers the four-CPU Genesis MP series, and Umax's SuperMac S900 has a slot for a second CPU card.

Although multiprocessing probably won't speed up most of your work, certain tasks within applications that take advantage of multiple CPUs can see improvements up to 3.5 times the speed of comparable-speed, single-CPU systems, according to Macworld Lab tests; typical gains, though, are around 2.5 times the speed of a single CPU.

Because the latest version of Photoshop can use multiprocessing in several key computations, it makes sense for imaging professionals to consider a multiprocessor system. Be prepared: the system cost is high, so you should make sure the extra work you do will offset the investment. A four-CPU, 150MHz Genesis MP 600 system with 32MB of RAM costs about \$17,500, while the system we tested—a 132MHz Genesis MP 528 with 16MB of RAM—costs about \$13,500. High stakes indeed, but for a service bureau or other high-volume shop, a Genesis MP could be a great value.

Adding a second CPU card to the Umax SuperMac should increase that system's speed by about 80 percent for multiprocessor-aware tasks. Umax expects to offer its multiprocessing card—which relies on the DayStar's multiprocessing software—for around \$1000 this summer. Macworld Lab tested a late prototype model without a second CPU card—Umax said it was final except for some stylistic refinements—and found it to be a superb choice. With an expected price of \$4000 for a 16MB configuration, and an optional UltraSCSI/100BaseT Ethernet card for \$500 more, this system could easily become the Mac of choice for professional image editors.

For many users, a two-CPU SuperMac S900 will be more attractive than the Genesis MP, since it costs less but still provides a notable speed improvement. Your choice ultimately depends on how often you perform multiprocessor-aware tasks and whether the extra work you can take in will justify the cost of the Umax card or of a full Genesis system.

Total Impact (805/987-8704) offers yet another multiprocessor option, the Total PowerSMP. This PCI card adds as

many as four PowerPC 604 CPUs to your Mac at speeds up to 150MHz, and includes the DayStar multiprocessing software. The card was not shipping as *Macworld* went to press, but the company expects the price of a four-CPU, 100MHz card to be \$3800.

As Macworld Lab benchmarks show, four CPUs aren't four times as fast as one CPU, nor are two CPUs twice as fast. As when multiple people share a task, there's additional overhead involved in splitting the computational work; one CPU acts as a supervisor as well as a worker, taking time out to coordinate the workload to the various processors.

So far, only Photoshop 3.0.4 and 3.0.5 and Strata StudioPro 1.75+ take advantage of multiprocessing, but several companies have agreed to support it in upcoming versions. Within the next year, expect to see multiprocessing versions of Deneba Canvas, Fractal Design Painter, and Live Picture (from Live Picture; formerly distributed by MetaTools).

An Extra Boost Whether you get a single-CPU system like a Power Mac or

a PowerWave, or a multi-CPU system like a Genesis MP or a SuperMac S900 equipped with a second CPU, you might also consider a Photoshop accelerator. You have two choices.

One option is the ThunderColor 30 series from Radius (408/541-6100). These PCI video-display cards—the \$1999 ThunderColor 30/1152 for 1152-by-870-pixel resolution on two-page displays, and the \$2499 ThunderColor 30/1600 for an image size of 1600 by 1200 pixels—include a ColorEngine daughter-card for Photoshop acceleration. (You can also add the \$999 ColorEngine to the Thunder 30 series of video-display cards for the same result.) Radius had no ColorEngines available for testing, and the company expects to offer a new version later this year. Unfortunately, we were not impressed with the Thunder 30's performance as a video-display card (see "Maximum Display," elsewhere in this section).

The other option—one worth considering now—is the PowerShop from Adaptive Solutions (503/690-1236). This \$2000 card accelerates several Photoshop

RATED: PHOTOSHOP SYSTEMS HARDWARE

Genesis MP 528

RATING: ★★★★★/7.2 **PROS:** Four CPUs accelerate common Photoshop effects; case accepts nine internal drives; easy to upgrade. **CONS:** Expensive; most tasks can't use multiple CPUs. **COMPANY:** DayStar Digital (770/967-2077, sales@daystar.com). **COMPANY'S ESTIMATED PRICE:** \$13,500 (16MB of RAM, 1GB hard drive, 256K cache, keyboard, mouse).

Power Macintosh 8500/120

RATING: ★★★★★/7.7 **PROS:** Supports two-page displays at 24-bit color with 4MB of VRAM. **CONS:** Difficult to add components; comparatively high price. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$4500 (16MB of RAM, 2GB hard drive, 512K cache, mouse).

Power Macintosh 9500/132

RATING: ★★★/6.3 **PROS:** Six PCI slots offer above-average expansion. **CONS:** The number of drive bays is low considering its size;

poorly designed for upgrades. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$4700 (16MB of RAM, 2GB hard drive, 512K cache, mouse).

PowerShop

RATING: ★★★/5.1 **PROS:** Accelerates several key Photoshop tasks. **CONS:** Incompatibility with Photoshop 3.0.5 Full PS Accelerator plug-in causes many tasks to run slightly more slowly than they do without the card. **COMPANY:** Adaptive Solutions (503/690-1236, info@asi.com). **COMPANY'S ESTIMATED PRICE:** \$2000.

PowerWave 604/150

RATING: ★★★★★/7.7 **PROS:** Relatively inexpensive; solid speed and expandability. **CONS:** None. **COMPANY:** Power Computing (512/388-6868, info@powercc.com). **DIRECT PRICE:** \$4249 (16MB of RAM, 2GB hard drive, 512K cache, video card with 4MB of VRAM, keyboard, mouse).

functions (you'll need version 3.0.4 or higher), and it's priced to attract people put off by the price of the Genesis MP.

Macworld Lab testing found that the PowerShop accelerated very few functions that a multiprocessor card would not—the only notable PowerShop advantage was in arbitrary rotation—and it does not accelerate several functions that a multiprocessor card would, including distortion, blur, noise effects, and fragment pixelation.

The PowerShop combines 64 processors on a 12-inch card to accelerate basic Photoshop functions, the same ones that Radius's ColorEngine speeds up. For \$2000, you'd probably expect more functions to be accelerated, but Adaptive Solutions is limited to those Photoshop functions that Adobe permits it to accelerate (essentially, features accessible via plug-in architecture).

Note that the PowerShop is not compatible with Photoshop 3.0.5's Full PS Accelerator plug-in, so in many cases it actually runs 2 to 10 percent slower than a regular Mac using Photoshop 3.0.5 with the plug-in installed. In benchmark testing, Macworld Lab removed the plug-in during PowerShop tests but left it enabled for the other systems. Adaptive is working with Adobe on a fix.

Power users with a real need for speed might want to combine the Adaptive card with a four-CPU Genesis MP or a dual-CPU Umax system, but check before you do: there's an incompatibility that vendors are trying to fix. As we went to press, the PowerShop and the multiprocessor Macs were incompatible. (Radius's ColorEngine has the same incompatibility with the multiprocessor Macs).

Choosing the Right System

Whether you decide on a single-CPU or multiprocessing system, you need to decide which model is best for you. Take these factors into consideration when making your choice.

The Power Mac 8500 and PowerWave 604/150 have three PCI slots, while the Power Mac 9500, Umax SuperMac S900, and Genesis MP have six slots. Most serious imaging users don't need more than three PCI slots: one for an accelerated video-display card (the 8500's built-in video supports 24-bit color on two-page monitors, but you'll still want the card for maximum performance), one for a SCSI accelerator or RAID card, and

perhaps one for a Photoshop accelerator card. Consider whether those three extra slots are really necessary, keeping in mind your future needs: you may someday want space for digital-video-input cards, or one of the new high-speed storage interfaces.

All these systems feature tower enclosures with plenty of space inside for extra drives. This frees up your desk space for important things like scanners, coffee mugs, and proof prints of your work. When deciding how many internal drive bays you need, keep in mind that the bundled 4X CD-ROM drive takes up one bay in all of the tower systems.

The Power Mac 8500 and PowerWave 604/150 both hold three half-height, 5¼-inch drives, but the PowerWave's case is designed for simpler upgrading, which gives it the edge. If you opt for the six-slot systems, both the Umax SuperMac S900 and the Power Mac 9500 hold four drives: two 5¼-inch bays and two 3½-inch bays each.

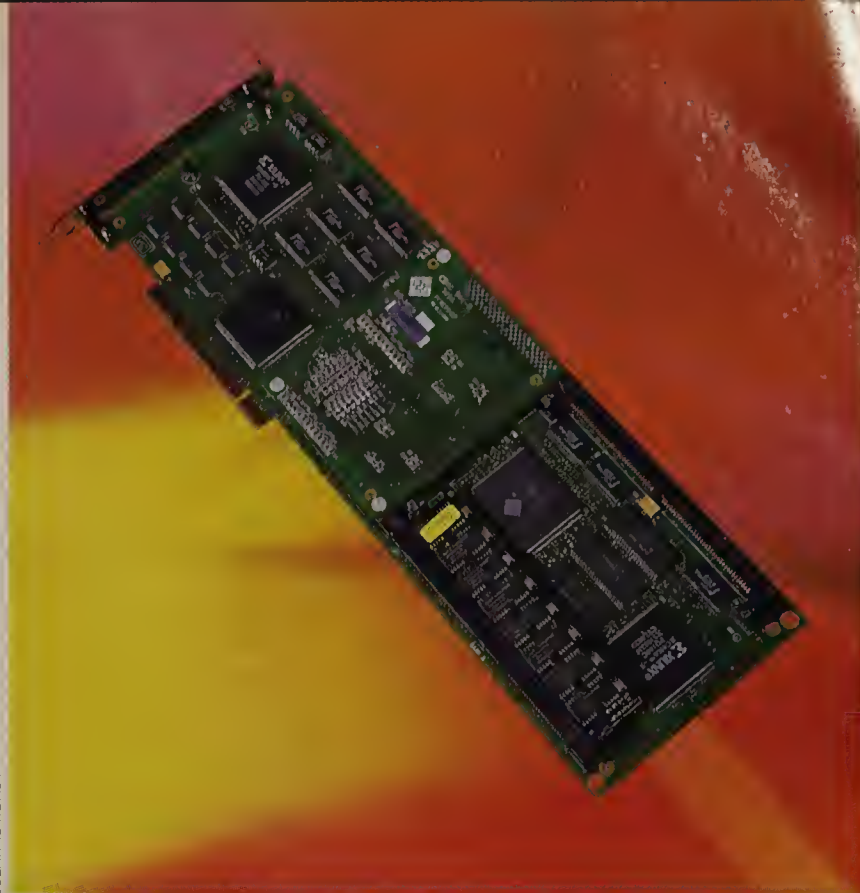
Finally, there's the Genesis MP, a huge beast of a Mac. Weighing in at around 60 pounds—and occupying twice the volume of any other Mac tower—this behemoth looks more like a shrunk-down mainframe than a personal computer. The Genesis has nine drive bays—seven 3½-inch and two 5¼-inch—and the internal SCSI cable can connect to six of them; you'll need a SCSI card to support more than six internal drives. Designed to accommodate an internal RAID system for fast disk access, the case makes adding and removing drives a snap.

Vital Components

Once you've selected your ideal system, make sure you properly equip it with the right peripherals.

RAM If you've gone to the trouble of purchasing a turbocharged system, you'll get your biggest performance boost by loading it with plenty of memory.

Longtime Photoshop users have a magic formula: be sure to buy three times as much RAM as the size of your largest typical file. For example, if you often work on files as big as 40MB, get at least 120MB of RAM on your system. (Figure about \$700 per 16MB increment.)



SUZANNE ROADY

Speed Limits The Adaptive Solutions PowerShop accelerates key Photoshop tasks, but an incompatibility with Adobe's Full PS plug-in causes it to perform many functions slower than a stock Power Mac.

It may sound like an incredible amount of RAM (and money), but Photoshop needs that much memory to avoid using its disk cache, which slows down operations considerably. Go for high-capacity DIMMs, such as 16MB and 32MB, so you'll use the fewest DIMM slots possible. After all, you may need to add even more RAM later as your file sizes increase.

Storage When you need to access your disk for opening or saving files, you'll want a fast drive. You'll also want high capacity—think gigabytes, not megabytes. When it comes to storage, don't be stingy: a 4GB or 9GB drive is a good investment for most imaging professionals. You can get an internal 4GB drive for as little as \$1000.

For maximum speed, opt for a RAID level 0 or 1 system, which speeds up disk access anywhere from 10 percent, when opening a file, to 52 percent, for copying it. These speed increases (like the others here) come at a dear cost: megabyte for megabyte, RAID systems cost four to five times what a standard drive does.

Another option for drives is Ultra SCSI, a new standard that promises to double data-transfer speeds. To get top performance from an Ultra SCSI drive, you need a PCI SCSI card from a company like Adaptec (408/945-9600) or Atto (716/691-1999). Ultra SCSI drives and cards were just starting to ship as *Macworld* went to press.

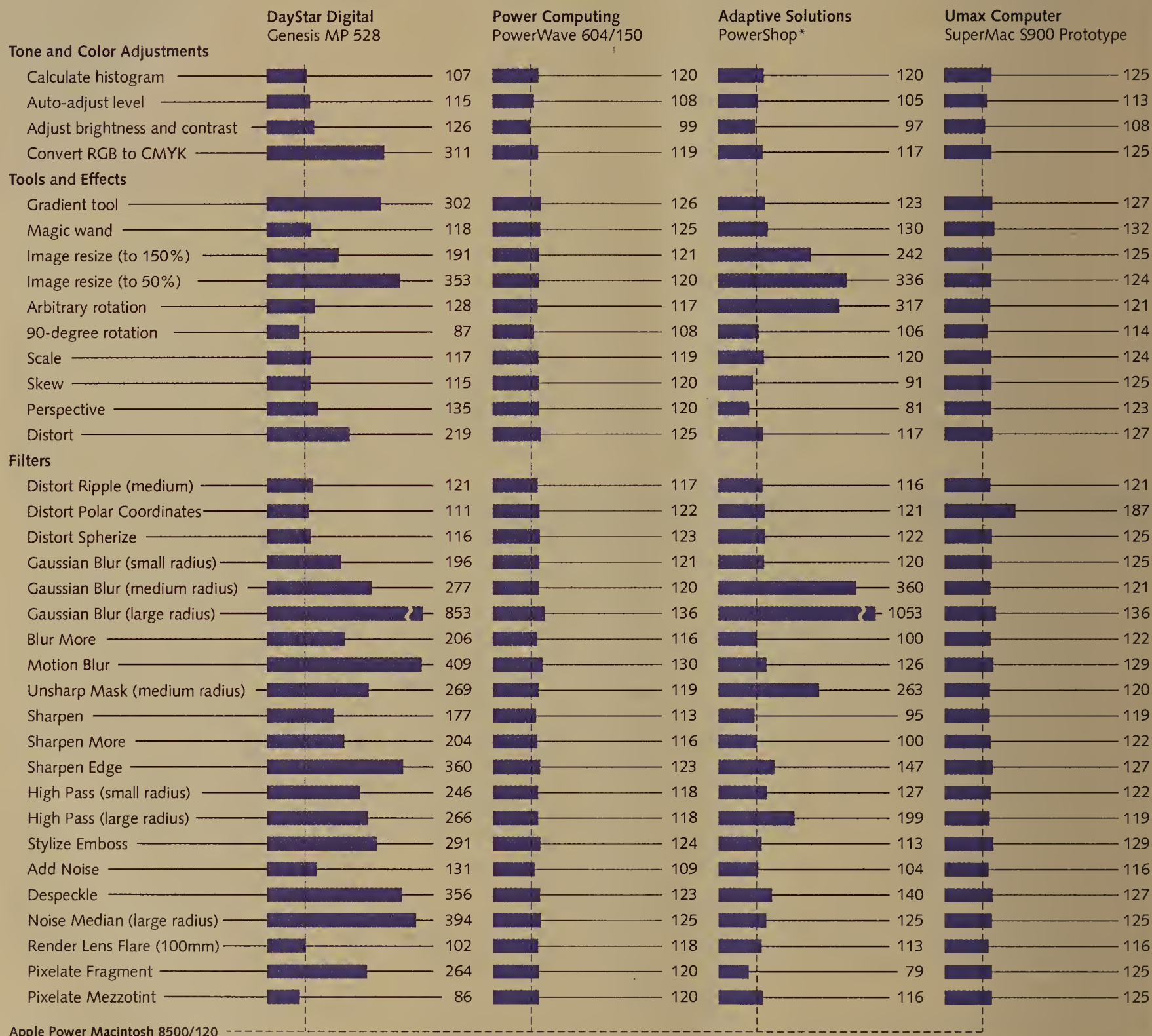
Along with Ultra SCSI, two more technologies are slated to crowd into the

Getting the Photoshop Edge

To gauge system performance for professional use, we performed a variety of typical Photoshop functions to see which ones the multiprocessor cards and Photoshop accelerators would speed up. The effects varied considerably, even among similar operations. In several cases, a filter or effect had dramatically different degrees of speed increase depending on its setting (see Gaussian Blur for a key example). When the speed increase was essentially the same for all settings, we reported just one

(as in the case of Unsharp Mask). When analyzing the results, notice that in some cases an accelerator can decrease performance. Keep in mind that the Power Mac 8500 runs at a slower clock speed (120MHz) than other systems tested and that the Genesis MP 528's CPUs run at 132MHz, not at 150MHz as the PowerWave's and SuperMac's do. You can expect the 150MHz Genesis MP 600 to perform comparably with these two systems for tasks not affected by multiprocessing.

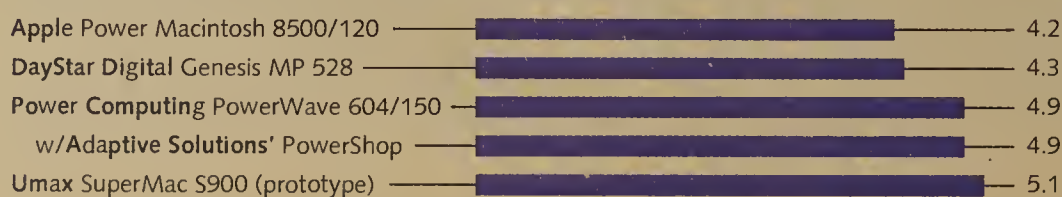
Longer bars are better. Speed shown as percentage of speed of a standard Power Macintosh 8500/120 (represented by the dashed line).



*Installed in PowerWave 604/150.

Macworld Core Performance Index

Numbers show each system's overall performance, not just its performance in image-editing tasks. Longer bars are better. Times as fast as a Centris 650 (Centris 650 = 1.0).



BEHIND OUR TESTS

We used System 7.5.2 on all systems. We used Photoshop 3.0.5 in all cases, but removed the Full PS Acceleration plug-in when testing with the PowerShop card, because of an incompatibility between the two. All systems were equipped with 128MB of RAM (with 100MB allocated to Photoshop) to minimize the effects of disk I/O. For details on our core performance tests, see "How Each Mac Stacks Up," February 1996, page 110.

—Macworld Lab testing supervised by Mark Hurlow

storage market soon. Drives based on the much-touted Firewire fast SCSI standard are expected to be available later this year, competing with drives using serial storage architecture (SSA), which offers higher potential throughput because it can read and write data at the same time. Microtech (203/468-6223) plans to ship SSA drives for the Mac this spring.

Ultra SCSI, SSA, and Firewire should be competitive in terms of price and performance, so you might wait to see which technology triumphs before investing a lot of money in any of the three.

Don't forget removable storage. Probably the most convenient option is a stackable drive system like the Joule from La Cie (503/520-9000) or the DataDock from MicroNet Technology (714/453-6100), but whomever you're sharing data with will need a system based on the same format. Ditto for emerging technologies like the hard-to-find Iomega (801/778-1000) Jaz cartridges, which hold close to 1GB of data (for more information, see *Reviews*, in this issue).

SyQuest (510/226-4000) plans to introduce a faster, 1.3GB competitor called the SyJet early this summer. You may want to purchase a traditional SyQuest drive as well so you can easily exchange files with clients or service bureaus who have standardized on this older technology.

Scanner You'll want a 30-bit color scanner to bring images and photographs into your electronic artwork. *Macworld* recommends the \$1000, 600-dpi ES-1200C from Epson America (310/782-0770; see "Scanner Solutions," March 1996). Although you can spend a lot less for competing scanners, the ES-1200C offers a compelling mix of performance and high-fidelity color at an affordable price.

Display Many high-end Mac systems come with a bundled video card or on-board video equipped for large-screen display. Should you consider replacing the stock video with an accelerated video-display card? The quick answer is yes, but not with the Radius Thunder series. Although the NuBus versions were top performers, Macworld Lab tests show that in the PCI PowerMacs they're laggards. Truth be told, we weren't impressed with *any* of the current crop of PCI video-display cards. The best of the lot are the IMS TwinTurbo-128M and Number Nine Imagine 128 (see "Maximum Display," in this section).

NuBus Boosters

The latest Mac systems all use the PCI bus, but you may have a NuBus-based Power Mac that you want to squeeze a little more life out of before trading up. Here's how you can increase its life expectancy.

Get a Photoshop accelerator. Your choices are the \$2000 PowerShop from Adaptive Solutions (503/690-1236) and the \$1099 PhotoEngine from Radius (408/541-6100). Both products accelerate the same functions.

Get a CPU booster. These inexpensive devices (prices range from \$150 to \$250) make your system's clock run faster, speeding up most operations. They're not endorsed by Apple, but they usually boost performance 10 or 15 percent (the amount varies from Mac to Mac). Several companies offer them, including Newer Technology (316/685-4904), XLR8 (512/346-2119), and KS Labs (614/374-5665).

Add more RAM. This is a great performance booster, but be cautious. If you plan on getting a new Mac in the next year, remember that NuBus Power Macs' SIMMs don't work in the DIMM slots of PCI Power Macs and clones.

Power Computing uses an ATI video card—similar to the Xclaim GA—in the PowerWave, and as *Macworld* went to press, the company began selling the IMS TwinTurbo-128M as a \$545 option. If you already have the ATI card, you may want to swap it out in favor of a faster model for optimal performance.

If you don't already have one, you'll want a two-page monitor. *Macworld* recommends the \$3100 Radius PressView 21 SR (see *Reviews*, February 1996), especially if you need accurate on-screen color proofing. Other top choices include the \$1900 MultiSync XE21 from NEC Technologies (508/264-8000) and the \$2200 RasterOps SuperScan Mc 21 from NSA/Hitachi (617/461-8300). (For more information, see "Full-Size Color Displays," *Buyers' Tools*, February 1996.)

The Last Word

Picking out a high-performance Photoshop system can be a dizzying process. Fortunately there are several great products to choose from. For most users, I recommend the PowerWave 604/150 from Power Computing, which earns the Editors' Choice award. The Umax SuperMac S900 offers more expansion and a slot for a second CPU, but the prototype we tested could not be rated.

Among the Power Macs, the 8500 makes a solid choice only if you're happy with the built-in video display's so-so performance. If you don't replace the on-board video, you're left with all three PCI

slots open, versus two on the PowerWave.

Consider the PowerShop Photoshop accelerator card only if it accelerates the tasks you perform routinely. The Day-Star Genesis MP 600 accelerates more functions than the PowerShop, but it costs \$6000 more than a 150MHz Mac-PowerShop combo. Still, it could serve as a great backbone system in a service bureau or high-volume image studio. The PowerShop and Genesis MP aren't for everyone, but they do meet real needs for some.

Armed with the Macworld Lab benchmarks, you're ready to pick your ultimate Photoshop system. Enjoy your new Mac! **m**

Executive editor GALEN GRUMAN covers emerging technologies and systems hardware for *Macworld*.

PHOTOSHOP SYSTEMS HARDWARE



A professional image editor needs speed foremost, followed by sufficient drive and card expandability, and a good price.

★★★★/7.7 **PowerWave 604/150** High speed, sufficient expansion capabilities, and a low price distinguish this system as the top platform for most Photoshop users. **Company:** Power Computing (512/388-6868, info@powercc.com). **Direct price:** \$4249 (16MB of RAM, 2GB hard drive, 512K cache, video card with 4MB of VRAM, keyboard, mouse).

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Maximum Display

Do the New 64- and 128-Bit Video Cards Deliver?

by Gene Steinberg

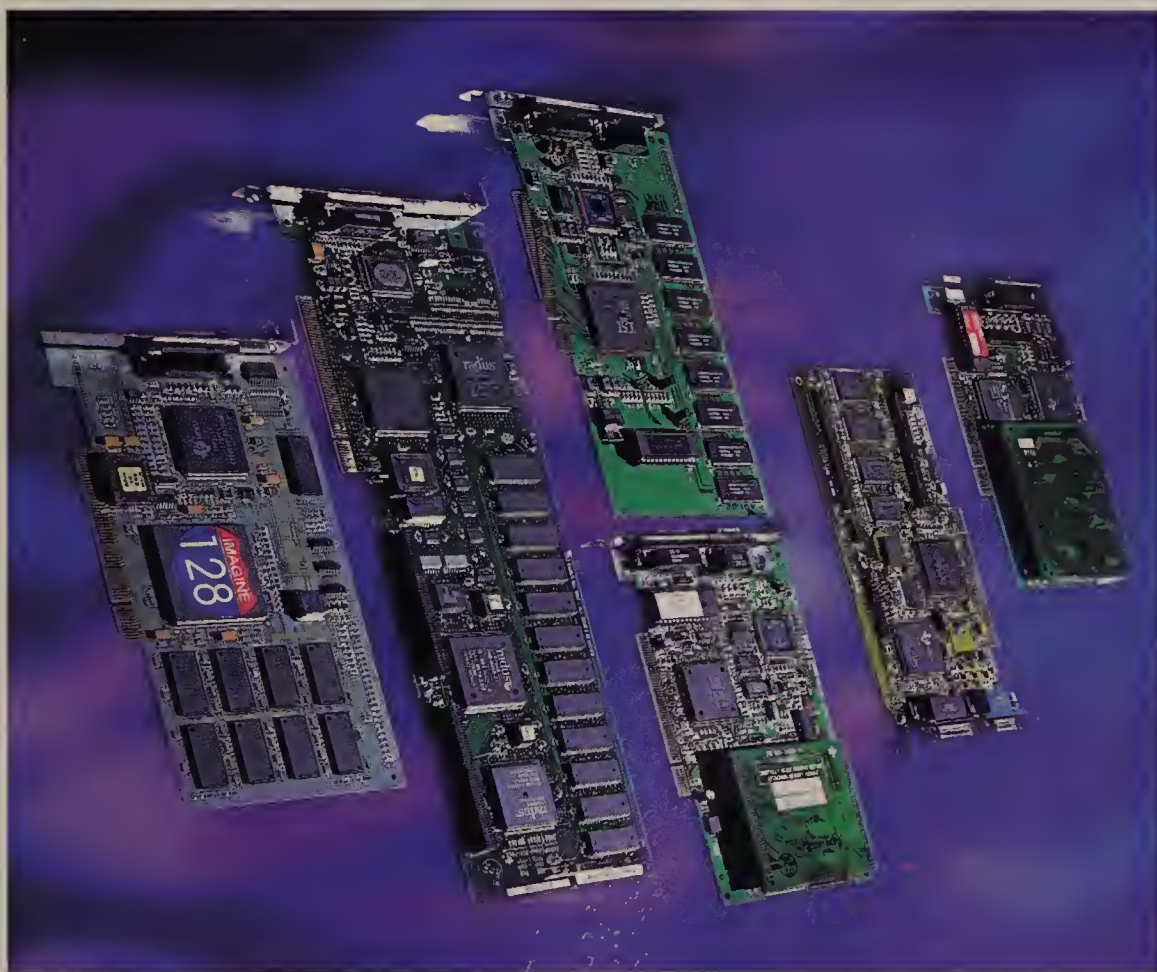


NOT LONG AGO, YOU had to spend several thousand dollars for a video card if you wanted true 24-bit color and accelerated display on your Mac. Imaging professionals who needed high-performance color looked jealously at their Windows-based counterparts, who could get accelerated video for just a few hundred bucks. The new PCI Power Macs have changed that equation, freeing Mac designers and production artists from display-card envy.

Many of the same manufacturers who produce low-cost accelerated video-display cards for PCs have entered the Macintosh market with similar products. In fact, the Power Mac 9500 and some Power Computing clones come equipped with a video-display card from Canada's ATI Technologies, a name familiar to Windows users.

If you have a Power Mac 7200, 7500, or 8500, you already have internal video capability that's upgradable to 24-bit color (millions of colors) on large-screen monitors. So why spend hundreds of dollars to get what you already have? Speed. If your work requires the fastest-possible screen display, you'll want to take a close look at the products tested here.

Macworld Lab tested six PCI video-display cards: the ATI Xclaim GA (similar to the card bundled with some PCI Macs and compatibles), the Diamond Javelin Video 3400XL, the Integrated



ROBERT PERRY

Micro Solutions (IMS) TwinTurbo-128M, the Matrox MGA Millennium, the Number Nine Imagine 128, and the Radius Thunder 30/1600.

The Numbers Tell the Tale

Macworld Lab put these six cards through an extensive battery of real-world tests. Nearly every card easily surpassed the speed of a Power Mac 8500's internal video, performing anywhere from two to three times as fast as on-board video in most benchmarks (see "Quirky Speed Demons: PCI Video-Display Cards").

Despite a noticeable performance

spread in the Microsoft Word and Excel tests, acceleration with QuarkXPress and Adobe Photoshop was quite close among the tested cards; you'd scarcely notice the difference without a stopwatch in hand.

Our FreeHand Preview test, which clocks the time it takes to preview a complex full-color illustration, was the showstopper. The ATI Xclaim GA—a lackluster performer in other tests—excelled at this one, running up to four times as fast as the other cards. Both the Matrox MGA Millennium and the Radius Thunder 30/1600 cards failed to keep pace on this test, falling behind not only the other

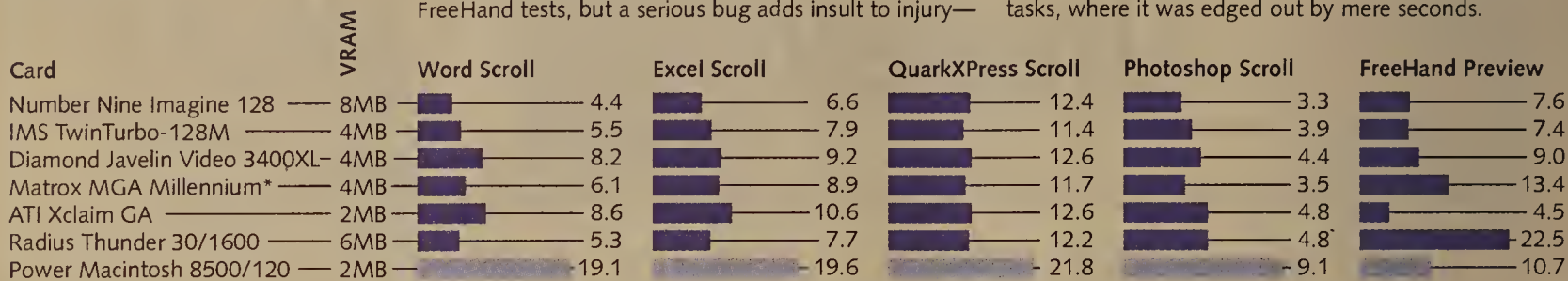
These six video-display cards perform common video tasks significantly faster than a Power Mac 8500/120's on-board video, but some aren't quite as ready for the real world as others.

The Thunder 30/1600's relatively strong performance was hampered by its poor showing in the FreeHand Preview test; Radius explained that a bug in some Thunder 30/1600 cards dramatically impairs acceleration of Free-Hand files. Not only were the Matrox MGA Millennium's acceleration numbers below average in the Excel and FreeHand tests, but a serious bug adds insult to injury—

floating palettes in any application must be closed in order for acceleration to take place. Even with palettes hidden to accommodate this flaw, the Millennium's speeds in our FreeHand Preview test were slower than the Power Mac 8500's on-board video. Both Matrox and Radius say they are working on bug-fixes, which should be available by the time you read this.

Not surprisingly, the sole 8MB card—Number Nine's Imagine 128—outperformed the others in most tests. The notable exceptions are the QuarkXPress and FreeHand tasks, where it was edged out by mere seconds.

Products are listed in decreasing order of overall performance. Times are in seconds. Shorter bars are better.



*Applications accelerate only with floating palettes closed.

BEHIND OUR TESTS

Macworld Lab tested PCI video-display cards with a series of real-world applications and files. We performed a variety of scrolling tests in Microsoft Word 6.0 and Excel 5.0; QuarkXPress 3.31; and Adobe Photoshop 3.0.4; as well as several screen redraws in Macromedia FreeHand 5.5. We tested all cards on a Power Macintosh 8500/120

running System 7.5.2 with 48MB of RAM and an internal 2GB hard drive. All cards were tested with a 16-inch monitor displaying 24-bit color (millions) at a resolution of 1024 by 768 pixels.—Macworld Lab testing supervised by Lauren Black

RATED: PCI VIDEO-DISPLAY CARDS

ATI Xclaim GA

RATING: ★★★★★/7.8 **PROS:** Fastest performance in FreeHand previews; adequate video-display acceleration; flexible pan-and-zoom software options. **CONS:** So-so performance in most tests. **COMPANY:** ATI Technologies (905/882-2600, 76004.3656@compuserve.com). **LIST PRICE:** \$449 as tested; 4MB version \$649.

Diamond Javelin Video 3400XL

RATING: ★★★★★/6.9 **PROS:** Decent video-display acceleration; enhanced QuickTime movie display. **CONS:** Unimpressive FreeHand preview speed; no custom control panel; lacks 832-by-624-pixel display setting. **COMPANY:** Diamond Multimedia (408/325-7000, sales4u@diamondmm.com). **LIST PRICE:** \$569 as tested.

IMS TwinTurbo-128M

RATING: ★★★★★/6.8 **PROS:** Good video-display acceleration; flexible pan-and-zoom software options. **CONS:** Slight screen-refresh artifacts; screen images shift position when color-depth settings change. **COMPANY:** Integrated Micro Solutions (408/369-8282, imsteksup@aol.com). **LIST PRICE:** \$699 as tested.

Matrox MGA Millennium

RATING: ★/2.8 **PROS:** Nice control panel; enhanced QuickTime movie display. **CONS:** FreeHand performance slower than Power Mac 8500's; acceleration disabled when floating palettes overlap document window; so-so QuickDraw 3D performance. **COMPANY:** Matrox Graphics (514/969-6320, graphics.sales@matrox.com). **LIST PRICE:** \$649 as tested; 8MB version \$999.

Number Nine Imagine 128

RATING: ★★★★★/8.3 **PROS:** Fastest overall acceleration; flexible software options; 24-bit color at 1600 by 1200 resolution. **CONS:** Software uses a lot of RAM; more expensive than most competing products. **COMPANY:** Number Nine Visual Technology (617/674-0809, dom-sales@nine.com). **LIST PRICE:** \$999 as tested; 4MB version \$699.

Radius Thunder 30/1600

RATING: ★★/3.5 **PROS:** Decent video-display acceleration; flexible pan-and-zoom software options. **CONS:** Poor FreeHand preview speed due to bug; sluggish screen refresh; expensive for its performance level. **COMPANY:** Radius (408/541-6100, support@radius.com). **LIST PRICE:** \$1499 as tested.

competitors but even our baseline Power Mac 8500's internal video. When we brought our results to Radius's attention, representatives informed us that a bug in "some" of the Thunder cards adversely affects Macromedia FreeHand acceleration; a patch is reportedly on the way. Matrox, on the other hand, was unable to provide reasons why its card fared poorly in this test.

Apart from the benchmarks, we performed additional everyday tasks to get a better idea of what you'll see and feel in your office or studio. For the most part, our benchmark results correlate to the subjective speeds we noticed, with one exception: aside from its FreeHand bug, the Radius card performed fairly well on Macworld Lab's test bench, but it seemed sluggish in day-to-day use. Its screen refresh, for example, was noticeably slower than the other cards'.

Nobody's Perfect

Although all the cards performed their basic video-acceleration tasks reasonably well, most had problems of one sort or another. The majority of these problems were merely annoying, but one was downright fatal.

The IMS TwinTurbo-128M shifted images horizontally—anywhere from 1/8 to 1/4 inch when switching between 8-, 16-, and 24-bit color depths. Since most monitors have front-panel centering controls, this was a minor annoyance, but you'll want to purchase a different

card if your monitor lacks this feature.

The Diamond Javelin doesn't offer the standard 832-by-624-pixel resolution you'd usually choose for a 17-inch monitor; I had to settle for 800 by 600—a PC-platform standard—instead.

With the exception of the FreeHand test mentioned previously, the Matrox MGA Millennium completed our benchmarks adequately, but a serious bug dramatically affected its overall rating: if a program's floating palette or tool bar overlaps a document window, video acceleration is disabled. Since nearly all applications—from high-end graphics programs to the top-selling word processor—have floating tool bars of one sort or another, this is a major shortcoming. Matrox claims that a fix is in the works, but until this flaw is corrected, we cannot recommend this card.

Extra, Extra

Three of the six cards we tested offer additional features beyond simple QuickDraw video acceleration. The Diamond Javelin Video 3400XL, IMS TwinTurbo-128M, and Matrox MGA Millennium offer enhanced QuickTime movie display, allowing you to scale your QuickTime movie-viewing window, for example, from the standard 160 by 120 pixels up to 320 by 240 while maintaining the performance and screen quality you'd expect at standard resolution. The MGA Millennium also offers 3-D acceleration, but as reported in our recent evaluation of QuickDraw 3D accelerators (see *Reviews*, April 1996), its speed improvement was no more than 10 or 20 percent—not enough to justify purchasing the card for this purpose alone.

If you've already invested in VRAM to boost the on-board video capabilities of your Power Mac 7500 or 8500, you might want to consider the \$399 IMS TwinTurbo-128M2, a low-cost version of the card we tested. The stock TwinTurbo-128M comes with 4MB of VRAM soldered on the card, but the TwinTurbo-128M2 comes with just 2MB on the card and a socket for your existing motherboard VRAM. In benchmark spot checks, the upgraded TwinTurbo-128M2 performed neck and neck with the \$699 TwinTurbo-128M.

Equipped with 8MB of VRAM in the configuration we tested, Number Nine's Imagine 128 was the only card which supports 1600 by 1200 pixels at the 24-bit

color setting (as compared with the 1024 by 768 size typically used on 20-inch monitors).

Defensive Drivers

Since video-display acceleration is a mysterious combination of hardware power and driver performance, you can expect manufacturers to tweak their software continually to improve performance and clear up bugs, a particular problem for vendors new to the Mac market.

During our tests, Matrox shipped a new driver, but it did not resolve the conflict with floating tool bars. Number Nine's updated version (4.0.2) of its HawkEye control panel—designed to deliver a performance boost and fix some minor bugs—arrived just in the nick of time for us to test it.

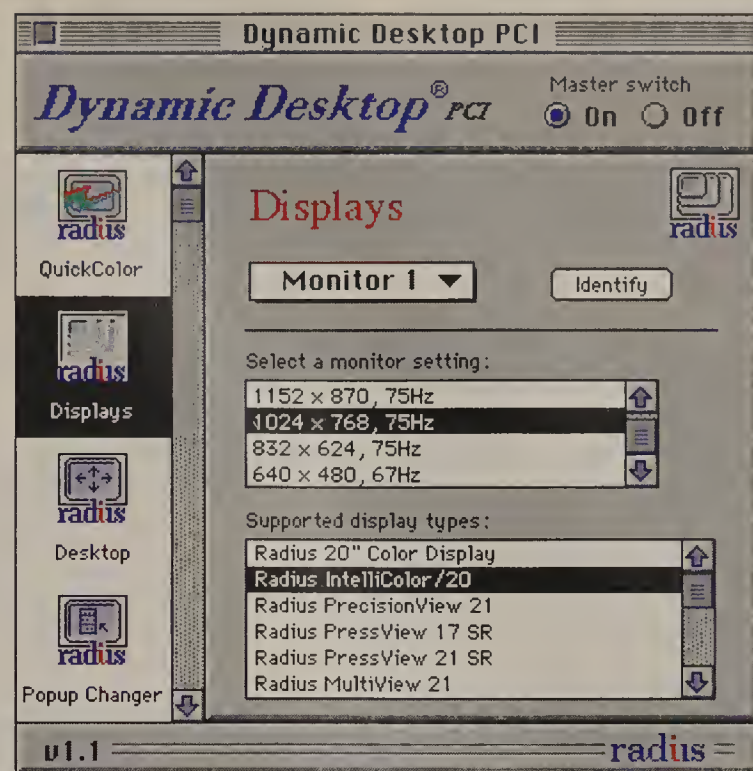
At press time, Diamond Multimedia informed us of its plans to release a major upgrade to the Javelin's QuickDraw driver that the vendor claims will yield a significant performance boost; Diamond expects to ship the upgrade by the time you read this.

With the exception of the Diamond Javelin (which uses the standard Apple control panel), all the video cards come with a custom control panel that lets you switch color depth and resolution. Those control panels also let you set pan-and-zoom settings to allow for an extended desktop beyond the visible borders of the monitor.

Number Nine's HawkEye control panel adds a font-cache setting to speed up text display; a screen saver; custom gamma settings; and—my favorite feature—live window dragging, a feature that allows you to see the contents of Finder windows as you move them, instead of the typical transparent box. Unfortunately, HawkEye is a bit of a RAM hog, using more than 750K with all options enabled.

The Last Word

All but two of these accelerated video-display cards surpass a PCI Power Mac's internal video speed by a wide margin. Although no single card came out on



Flexible Settings The Radius Dynamic Desktop control panel adds custom monitor settings to its bag of tricks.

top in every test, Number Nine's Imagine 128 provides the fastest overall display acceleration of the bunch. Its speed, flexible software options, and high resolution make it the best choice if you have money to burn.

Offering a solid low-cost option, the ATI Xclaim GA blazed through our FreeHand test and performed fairly well in other areas, especially in light of its relatively low price (less than one-third the cost of the highest-price card). If you're a graphic designer and work primarily in FreeHand, the Xclaim GA is worth thoughtful consideration.

The Thunder 30/1600's FreeHand glitch is less traumatic than the Millennium's floating-palette problem, but both Radius and Matrox have some serious bugs to resolve before we can earnestly consider their offerings. **m**

GENE STEINBERG is the leader of America Online's Mac Multimedia Forum. He has contributed material to *Mac & Power Mac Secrets* (IDG Books Worldwide, 1996) and the sixth edition of *The Macintosh Bible* (Peachpit Press, 1996).

PCI VIDEO-DISPLAY CARDS



Although most of the display cards we reviewed surpassed the speed of our baseline system, none is without flaws. No single product stands out as being dramatically superior to the others.

Are you getting the performance out of

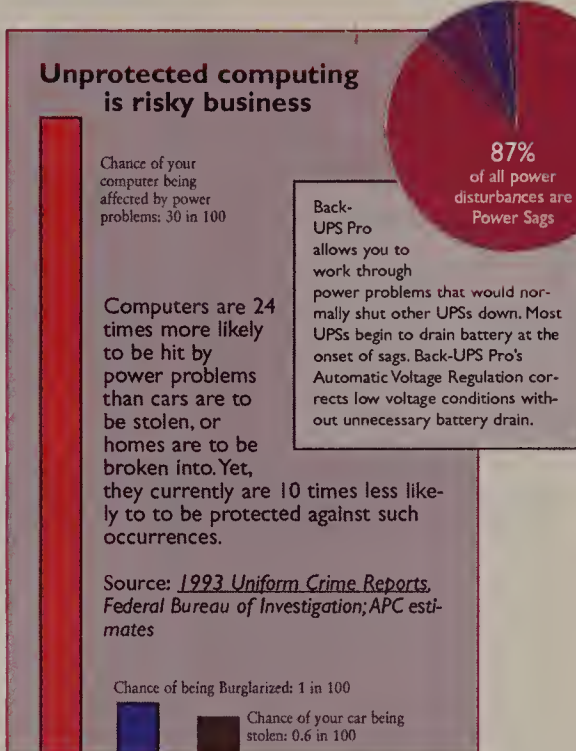
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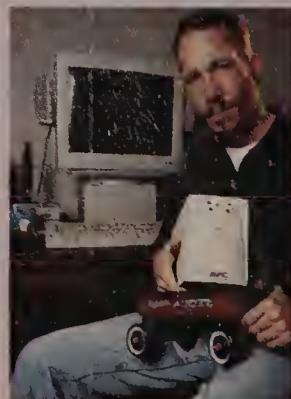
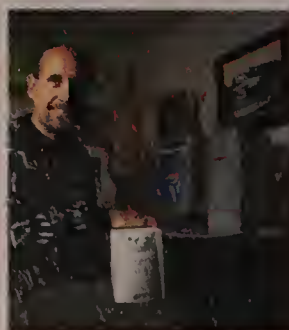
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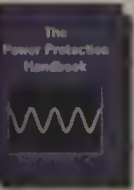
CLOCKWISE: "After 13 plus years in the computer industry (with both Apple and Digitol), I have changed directions and now live in the Santa Cruz mountains, where the power is as bad as the view is beautiful," says Harold Striepe. "Now I spend most of my time consulting and writing fiction. The power is the worst during rainy season and brownouts are a daily occurrence. But, not a problem for me since I got my Back-UPS Pro with AVR - now, I work through the rainstorms."

"I am the Product Development manager for Radio Flyer," says Antonio Pasin. "But quite often, I work at home, where I pay for all the equipment...my TV has been zapped in the past (it turned GREEN!). Here, I don't have an extra \$1200 to replace the DAT tape backup...on investment in APC is more cost effective for me. But besides just protecting the hardware, I look it it as protecting my media...I have lots of time invested in my data, and Back-UPS Pro protects that as well. Not to mention the unit is well-designed, easy to use, and APC provides great customer service to boot."

"I am a graphic designer/illustrator, using mostly 9500/132 and 8100/80 PowerMacs, in central Florida, the lightning capital of the world," said Thomas Sessions of Sessions Design in Orlando. "We lose power on a weekly basis and have constant outages...I've used APC for at least 8 years, but Back-UPS Pro is my current favorite - it has a smaller footprint and I can plug in my modem. Before UPSs, when we heard a thunderstorm, you would just hurry and try to get the work done, then just shut down-unplug the machines and take a break...now I wouldn't work without one...particularly in this deadline oriented industry."



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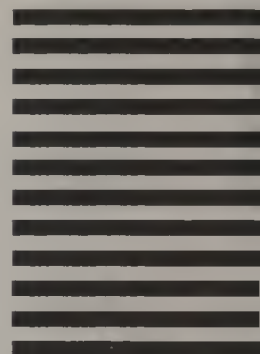
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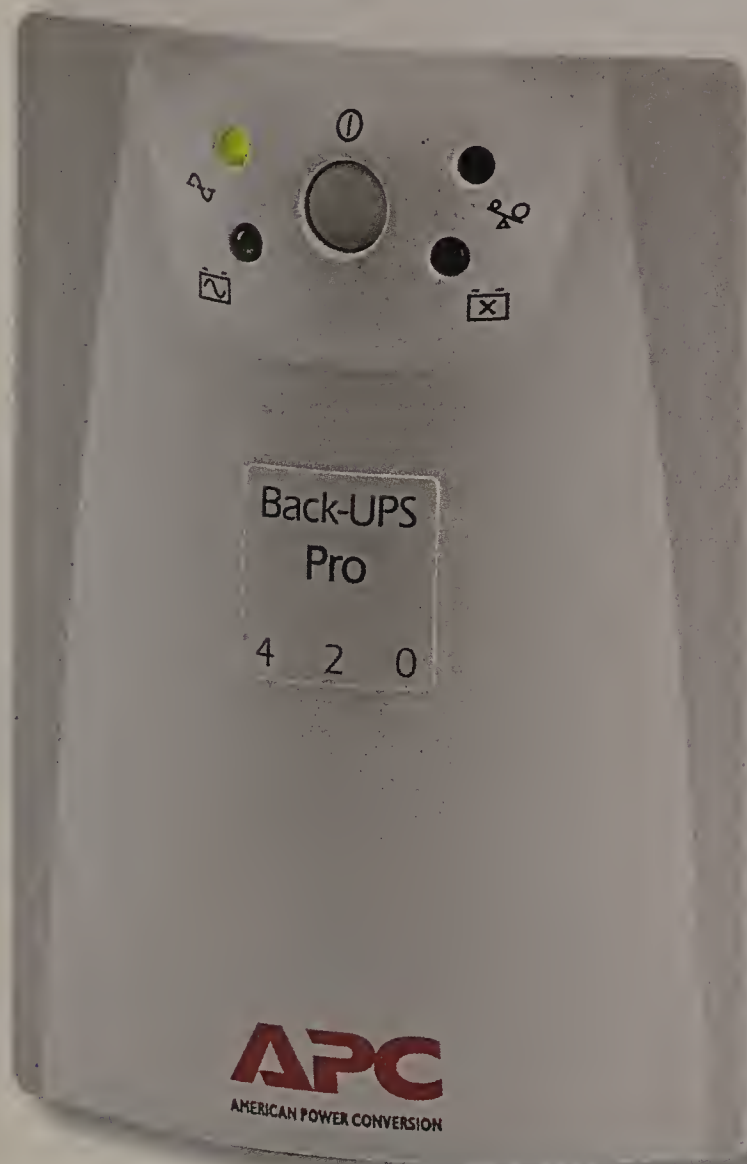
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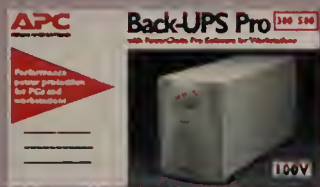
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THE MACWORLD OFFICE

At first glance, the appeal of a prepackaged office-software suite—such as Microsoft Office—seems apparent. First, such a bundle appears to cost less than the programs sold separately. Second, you might expect to save some disk space by avoiding redundant components, such as multiple spelling dictionaries from different software companies. Finally, if the ads speak true, such programs can easily share data. But in fact the advantages of buying a prepackaged office suite aren't so clear-cut. By buying all your programs from one company, you almost guarantee that you aren't getting the best possible program in each category—after all, no one software company is the best at everything. Furthermore, a prebundled software suite doesn't necessarily mean efficient use of disk space or RAM; a

complete installation of the *three* Microsoft Office programs, not even what *Macworld* considers a complete suite, consumes 96MB of disk space. (Microsoft Office programs also require far more RAM per program than their stand-alone rivals.) And if data sharing among programs is important to you, Mac technologies such as drag and drop, and publish and subscribe, let programs from rival publishers exchange information with minimum RAM or speed overhead (unlike, say, Microsoft's OLE extensions).

One possible solution, of course, is an integrated program like ClarisWorks. Indeed, thousands of small-business owners use this compact, inexpensive, cleanly designed program with complete satisfaction. But what if you need more? What if you want relational features in your database, automatic sentence capitaliza-

tion in your word processor, or outlining in your spreadsheet?

If your demands outstrip ClarisWorks' abilities, you might begin to dream of an office suite whose components are chosen on the basis of overall excellence. Your initial software expenditure would be higher, but perhaps your savings in disk and RAM requirements would even the economic score. And maybe the components of a custom-assembled office suite would launch, run, save, and print faster than prepackaged suites, letting your ideas flow more easily—and getting you home sooner.

There is such a suite. We call it the Macworld Office.

SUITE SELECTION

The Macworld Office components weren't chosen on the basis of feature count alone. Instead, we placed a premium on qualities that seem to be in short supply these days—speed, efficiency, and stability. What good is a word processor with database fields if it takes several minutes to launch? What's the point of a presentation program if it destabilizes your Mac by dumping extensions into your System Folder? As the Mac becomes more complex, as more extensions crowd our System Folders, as 30MB solo appli-

BY DAVID POGUE



12 Auto

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Maximum value

MAGNETIC

Formulate theory

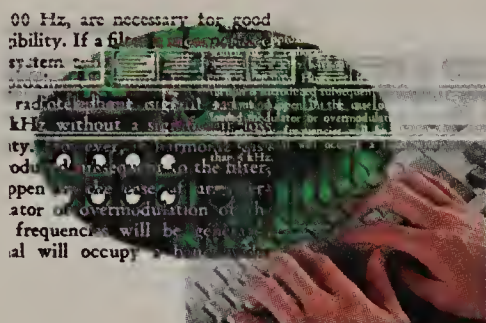
Predict new observations

Available observations

New data

cations become commonplace, the value of speed and stability multiplies.

In this article you'll read about the core business programs of the Macworld Office: the best word processor, database program, spreadsheet, and presentation software we could find. Elsewhere in this issue, "Office Essentials" covers the add-on programs that round out this software suite: the E-mail reader, calendar, address book, macro program, and utilities that work with these core programs and bind them together. And "Office Secrets" offers you some hints about how to use the Macworld Office most effectively.



PRODIGIOUS WORD PROCESSOR

In many ways, the word processor is the cornerstone of a software collection. Not only do most of us use words more than we use any other medium, but the word processor has evolved on the Mac into the home base for spreadsheet cells, photos, charts, movies, and sounds.

WordPerfect 3.5 is the heart of the Macworld Office. It's blessed with the speed (and PowerPC-native acceleration) of much smaller programs. Yet it offers most of the advanced functions of, say, Word 6: spelling and grammar checking; customizable tool bars; reassignable keyboard shortcuts; a built-in graphics window; a smooth, well-designed table maker; style sheets; a macro language; an equation editor; outlining; and even a watermark (transparent overlay) feature.

But beyond its feature list, WordPerfect has strengths in three key areas: a superior interface, links to other software, and special timesaving components.

At first, WordPerfect's interface appears to consist of just the same sort of tool bars that clutter Word 6's screen—rows of buttons for formatting text, editing tables, choosing ruler settings, and so on. But there are two enormous differences between WordPerfect's approach and Word's. First, WordPerfect's buttons

often display plain-English labels instead of cryptic icons. Second, a single master WordPerfect tool bar controls the presence of all its *other* tool bars. Therefore, you can show or hide any tool bar with a single click; in Word, by contrast, you must visit a dialog box or use a secret key-stroke to change your tool-bar setup.

More important, WordPerfect is a Macintosh program to its very core. The program has embraced just about every relevant technology developed by Apple: QuickTime, AppleScript, QuickDraw GX printing, Macintosh Guide (where the program demonstrates common tasks right in your document), WorldScript (to handle foreign language systems), and speech synthesis (WordPerfect reads your writing back to you aloud).

And then there's Macintosh drag and drop: WordPerfect takes full advantage of this timesaving, useful feature. (Microsoft products offer only limited versions of drag and drop.) Highlight some text, drag it clear out of the window to your desktop, and it becomes a "clipping file" that you can insert into a document simply by dragging it there. Option-drag to duplicate text or drag to move it—these touches make editing dramatically faster and easier.

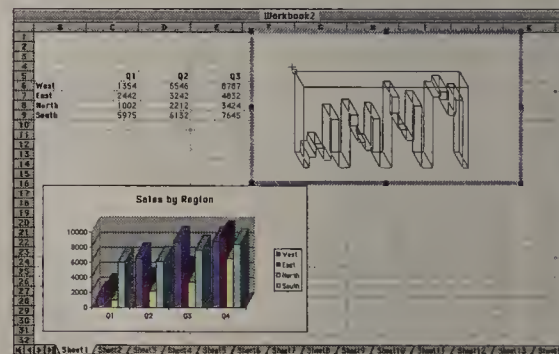
WordPerfect also has friendly relations with other programs, even rivals. It can both open and save documents from dozens of word processors, including Word 5 and, surprisingly, Word 6. Drag and drop makes WordPerfect a natural companion to the auxiliary programs in our suite, such as Claris E-mailer and Now Contact. And WordPerfect demonstrates that if you want to share data among programs, you don't have to suffer the RAM, disk-space, and speed penalties of Microsoft's OLE technology; with one click on a WordPerfect tool bar, you can import selected Claris FileMaker (2.1) database records, or selected cells of a Microsoft Excel spreadsheet, into your document, neatly formatted as a table. Finally, of course, WordPerfect publishes and subscribes with aplomb (see the diagram, "How Do the Macworld Office Applications Work Together?").

WordPerfect also shields you from petty word processing hassles. For example, the program can automatically capitalize the first word in each sentence, turn double spaces into single ones, delete an accidental space before a period or comma, turn (c) into ©, curl your quota-

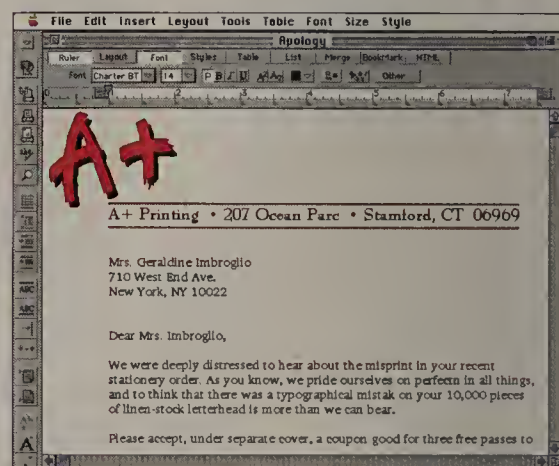
tion marks, and so on. Shortcuts abound, such as the impressive Make It Fit command (which tweaks the line spacing, margins, and other parameters to make your document fit a specified number of pages). And, of course, WordPerfect also offers the typing-shorthand feature, made famous by Word 6 and by the shareware program TypeIt4Me, which lets you designate typed, self-expanding abbreviations for longer text phrases.

Unfortunately, three nagging problems keep WordPerfect from living up to its name. You can make self-renumbering outlines, but you can't collapse them, and you can't adjust how much space appears above a paragraph (only below). While WordPerfect does a great job of importing Word documents intact, complete with style sheets, a strange bug prevents you from editing those imported styles; to reformat such documents, you must reapply genuine WordPerfect style sheets.

Then there's the issue of WordPerfect's ownership: the program was recently purchased by Corel. The new company says it intends to continue developing and marketing WordPerfect for the Mac,



Graphing in Space A feature that made Excel famous: if you double-click on a 3-D chart's handles, you can rotate it in three-dimensional space (upper right) until it shows just the angle you want.



Bars of Beauty WordPerfect's interface uses controls that have the simplicity of button bars (second row, top)—but each pops in and out of view with a single click on the master bar (first row, top), instead of requiring you to trudge through dialog boxes.

and may even rehire some of the programmers who had been let go by the previous owner, Novell. WordPerfect's future looks bright—but only if Corel sticks to its stated intentions.

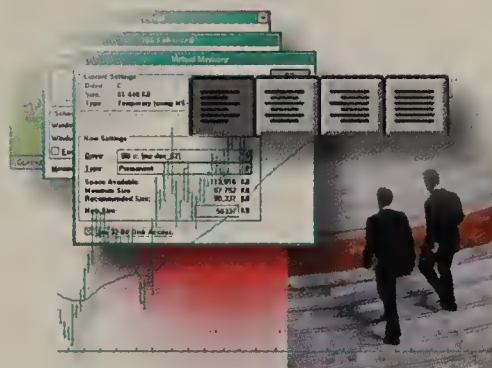
On the whole, though, WordPerfect offers a better combination of power, speed, intuitiveness, and adherence to the Mac interface than any competitor.

Runner-up By our standards of speed, stability, and efficiency, Word 5.1 is the runner-up. It isn't PowerPC native, and its feature list doesn't extend for quite as many miles as its successor's; in particular, it lacks Word 6's macro language,

editable preview, multiple undo, and typing-shorthand features. But Word 5.1 runs on 1MB of RAM and on a Power Mac 7100 launches in seven seconds—the same as WordPerfect. (To get Word 5.1, you must buy Word 6.0.1, then call Microsoft and order a Word 5.1 "downgrade" for \$20 plus tax).

Word 6, on the other hand, is certainly feature-laden. But it's also essentially a Windows program; it comes with manuals featuring illustrations from Windows and has an interface bearing little resemblance to the familiar Mac environment. It's also a resource hog; compared

with WordPerfect, Word 6 requires 33 percent more RAM, occupies 25 percent more space on the hard drive, and costs more than twice as much. It also takes four times as long to launch, though System 7.5.3 boosts loading speed slightly. (The free System update is available from *Macworld's* Web site and America Online forum, or get a CD-ROM copy for \$13 from Apple [800/293-6617, ext. 984].)



OFFICE PRODUCTIVITY SOFTWARE

ClarisWorks 4.0

★★★★/8.4 **Company:** Claris (408/727-8227, www.claris.com). **Company's estimated price:** \$129. Many companies already use the surprisingly complete ClarisWorks 4.0 as their office suite. The program's speed, clean design, and low resource requirements put the big boys to shame.

FileMaker Pro 3.0

★★★★/8.2 **Company:** Claris (408/727-8227). **Company's estimated price:** \$199 (any upgrade \$99). FileMaker 3 is now relational and Power Mac native. Graceful design touches make it more endearing than ever.

Microsoft Excel 5.0

★★★★/7.1 **Company:** Microsoft (800/426-9400). **Company's estimated price:** \$295. Excel 5 wins because it's the only game in town for serious number-crunchers. It's a disgusting glutton for RAM and disk space, however; use the previous version if you can find it.

Microsoft Office

Company: Microsoft (800/426-9400). **Company's estimated**

price: \$475. This package, which includes Word, Excel, and PowerPoint (all rated here individually), offers a better value than buying any two of the included products separately.

Microsoft Word 5.1

★★★★/6.7 **Company:** Microsoft (800/426-9400). **Company's estimated price:** \$320. Word 5.1 isn't the most feature-packed program on the planet, but it's fast, sleek, stable, and probably the most widely used Mac word processor on earth.

Microsoft Word 6.0.1

★★★★/5.1 **Company:** Microsoft (800/426-9400). **Company's estimated price:** \$295. The most bloated word processor on earth may be mandatory in big corporations. For anyone with a choice, it's an embarrassment whose designers arrogantly jettisoned the Mac interface.

Panorama 3.0

★★★★/7.1 **Company:** ProVue (714/841-7779). **Company's estimated price:** \$290. This database program features easy, flexible forms, hypertext links, and fast network abilities.

Persuasion 3.0

★★★★/6.4 **Company:** Adobe Systems (206/622-5500). **Company's estimated price:** \$259. *Easy to use* and *sprightly* aren't terms that spring to mind when you contemplate Persuasion 3.0, a behemoth of a presentation program. But it does just about anything a pro would need, including far more animations than its Microsoft rival.

PowerPoint 4.0

★★★★/6.9 **Company:** Microsoft (800/426-9400). **Company's estimated price:** \$295. PowerPoint has come a long way. If you turn off those irritating tool bars, you get a solid, simple-to-use slide machine. It's light on animation features, but everything else you need is one click away.

WordPerfect 3.5

★★★★/7.4 **Company:** Corel (613/728-8200). **Company's estimated price:** \$129. In feature count, it's halfway between Word 5.1 and Word 6. But in speed, interface, efficiency, and Mac integration, WordPerfect wipes the floor with all competitors. The steep price drop since our last rating also makes a big difference.

SPECTACULAR SPREADSHEETS

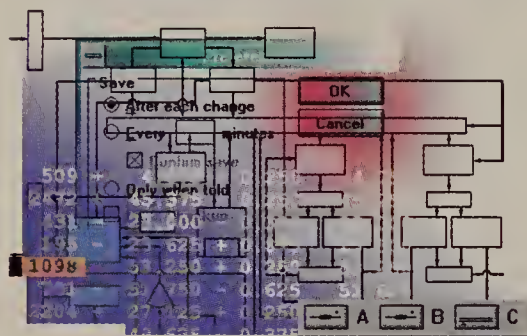
A Microsoft ad a couple years ago read, "99 percent of Macintosh spreadsheet users use Microsoft Excel. What are we doing wrong?" The answer is: practically nothing. Excel has no competition in the Macintosh world. Fortunately, Microsoft has continued to improve the program anyway. Version 5 at last introduces variable type styles within a single cell, and in-cell editing (you're not forced to type into a little strip at the top of the screen). Its Visual Basic programming language is powerful and fairly easy to work with (though that's little consolation to version 4 owners whose most advanced macros no longer work). And Excel 5's automation features, though trademarked with silly names like PivotTables and AutoSum, go a long way toward streamlining specific data-crunching goals.

The most serious problem with Excel is its sheer bulk. The entire program requires 30MB of hard drive space—7MB for the application alone—and its RAM requirement on a Power Mac is an embarrassingly large 11MB. This lack of programming discipline violates our rules for the Macworld Office. Actually, at only 1.7MB on disk, with a suggested memory appetite of only 2MB, Excel version 4 would arguably be a better fit—if only it were still for sale.

Runner-up There's *one* other Macintosh spreadsheet: ClarisWorks. Particularly in version 4, the ClarisWorks

spreadsheet has the power of, say, an earlier Excel. Its 24 chart types and 100 functions, split-window features, individual cell-formatting capability, flexible row heights, and fast, clean operation make it excellent for everyday spreadsheet work.

Of course, Excel's ability to analyze, fold, rotate, and summarize complex data towers over ClarisWorks'. But if such terms as *database ranges*, *variances*, *means*, or *regression* don't hold much relevance for you, ClarisWorks will save you time, resources, and money—the application takes less than 2MB of disk space, runs in 1.4MB of RAM, and costs \$129.



DATABASE DELIGHT

For mailing lists, inventory, form letters, invoices, catalog entries, collection tracking, and almost any other kind of forms or data management, Claris's FileMaker Pro is the obvious choice. In version 3, FileMaker makes constructing good-looking, efficient database files easier than ever. As in previous versions, its central concept—unlimited different views ("layouts") of the same data—lets you reuse existing information with minimal effort.

Small and medium-size businesses will especially treasure the new *relational* aspect of FileMaker 3. Working with a relational database means you can use the same morsel of data—someone's street address, say—in more than one database file. Change an address on your master client list (or anywhere), and the address is also instantly corrected in the orders file—and anywhere else it appears. In reality, the name is stored only once, in the master list, and only references to it appear in other files. By using relations between your database files, you wind up with smaller files, data consistency between them, and much less data entry.

Fortunately, if you don't need FileMaker's relational feature, you can ignore it; FileMaker 3.0 boasts many smaller improvements and remains as easy to use as ever. You can still share a file across a network (several people can work on a file simultaneously, but only one can edit a particular record at a time). FileMaker's check boxes, pop-up lists and menus, and radio buttons are even easier to set up in version 3—and the relational feature means that a menu in, say, your order form can list the products that appear in your catalog database. Again, you've saved time and eliminated redundancy.

Longtime FileMaker fans will be disappointed to know that a database, once sorted, still won't maintain its sorted order (unless you clone the file and reimport the data into the clone; CE Software's QuickKeys, an auxiliary part of the Macworld Office suite, can help with that chore). But the new features more than

compensate. (Macworld Office bonus: you can compose a form letter in WordPerfect, then drag and drop the entire text directly into your FileMaker layout—impossible with Microsoft products.)

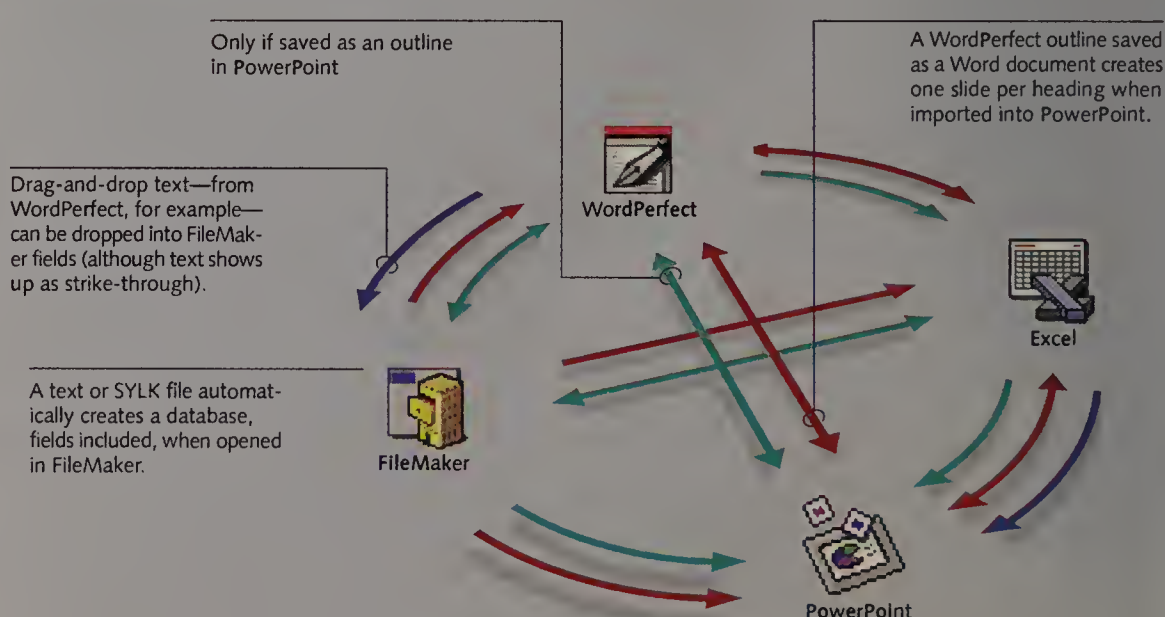
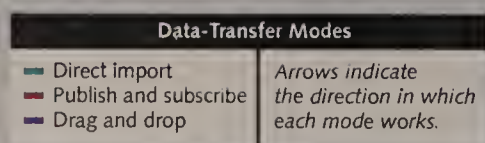
The bottom line is that you can use FileMaker to create sophisticated data-crunching systems that were once the province of hard-core relational environments like ACI US's 4th Dimension or Microsoft's FoxPro. (Bear in mind, though, that FileMaker Pro will crunch large data sets—about 2000 or more records—more slowly than those other relational databases.) And true to the Macworld Office philosophy, FileMaker is gentle on your resources: remarkably, it runs in as little as 1MB of RAM and occupies only 2.2MB on the hard disk.

Runner-up FileMaker's longtime rival, Panorama, has also just been released as version 3, to the certain delight of its small but passionate following. Now more than ever, Panorama is ideal for creating hypertext-style documents, where clicking on buttons and pieces of text takes you elsewhere in a file (to another layout, for example). You can now drop a word processor window—complete with hidden text styles and discontinuous selections—into any layout.

Panorama 3's most attractive features include Clairvoyance (in which the program completes an entry for you if it recognizes what you have begun to type), "elastic forms" (featuring fields that automatically change size or shape to maintain the overall design of the layout when you resize the window), and an ingenious new

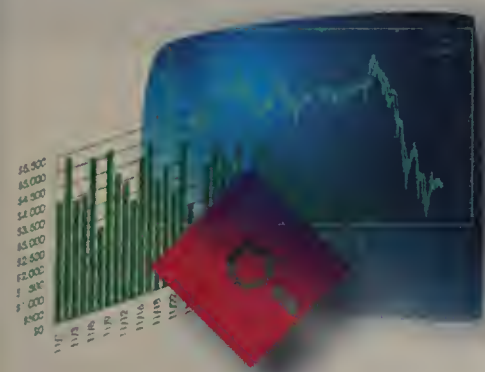
How Do the Macworld Office Applications Work Together?

The Macworld Office applications stand out for their quality individually, but they also form a suite in the ways they work together to improve your productivity. You already know about copy and paste, of course; this diagram shows how these programs use more-sophisticated Mac technologies to transfer data between programs. Some of the transfers offer hidden efficiencies, as noted.



client/server architecture: Each Panorama user's Mac has a separate copy of the master database—preserving all the speed for which the RAM-based Panorama is famous. But as each record is modified, the changes are sent to the master copy (on a server Mac), and from there to all other individual copies.

FileMaker's simplicity, relational skills, and enormous popularity make it the best choice for most people. But Panorama is a worthy candidate if you're after a database that offers the usual features of a Mac program—such as tool bars and dialog boxes—and you don't need full relational features. (For more on Panorama, see *Reviews*, in this issue.)



PRESENTATION PLEASURES

Two years ago, naming Microsoft PowerPoint a model of slide-show excellence would have been laughable. In previous versions you couldn't change your mind about a presentation's overall design once you began it, nor could you reuse a presentation in another screen format (say, from transparencies to 35mm slides).

But if you turn off those confusing Microsoft button bars, the current version is a paragon of clean design. A handy row of window icons let you switch easily between the five standard views: the outliner, where you type up the text of your slides; the slide view, where you adjust graphic elements on each slide; the sorter view, where you can drag thumbnail slide images to rearrange them; the notes view, where you can add speaker's notes to a reduced-size image of each slide; and the slide-show or rehearsal mode, in which each slide fills your screen. In an inspired bit of intelligence, PowerPoint can import an outline from WordPerfect and convert it instantly into a slide show.

PowerPoint shines when you're in a hurry; its most useful features are never more than a single menu command away. One command lets you switch to a differ-

ent graphic design or color scheme. Another lets you specify one of 45 cross-fade-type effects between slides. A few unique features are godsend for the real-life speechmaker; for example, after you rehearse your talk with the program, it can tell you how long your speech was, and how long you dwelled on each slide.

PowerPoint's reliance on Microsoft's OLE technology is its best and worst feature. On one hand, the cluster of included helper OLE programs are useful indeed—you get one program apiece for generating graphs, tables, organization charts, equations, and twisted-text special effects. But inserting an OLE object involves a slow, hard drive-thrashing, memory-gobbling handoff to the appropriate OLE program—a process that's disconcerting and sometimes (if you're strapped for memory) fruitless.

PowerPoint is not the program to use if you need spinning titles and growing bar-chart bars to spice up your talk; except for bullet points, PowerPoint can't animate much of anything. (For interactivity and animations, the amazing Astound [\$249.95; Gold Disk, 408/982-0200]—half presentation program, half multi-

media-construction kit—is superlative.) Otherwise, though, PowerPoint's time-saving features, combined with the logical layout of its controls, make it a good Macworld Office candidate: clean, stable, and devoted to its purpose.

Runner-up Adobe Persuasion is the undisputed feature king of the slide-show circuit. It provides tweaky control over every aspect of every slide, down to the shadow color on shadowed text. Its incredibly rich graphing program makes PowerPoint's look amateurish. Persuasion offers more animation, more sound effects, more master-slide types.

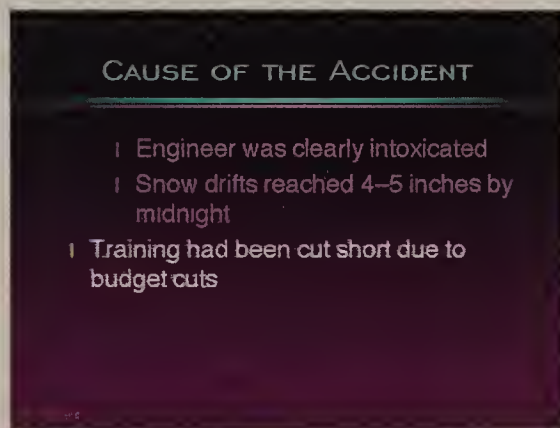
And more complexity. Of its 80 menu commands, 44 do nothing but make dialog boxes or submenus appear. Persuasion is almost unbearably slow, too, even on a Power Mac. For example, on a 7100/80, it takes 13 seconds to create a new untitled document. Still, Persuasion dominates in features—especially for generating graphs—and it's beloved by full-time presentation preparers.

THE LAST WORD

WordPerfect, Excel, FileMaker, PowerPoint: a suite designed to work together, to spare you the expense of expanding your storage and RAM capacity, and to minimize the time you spend troubleshooting and manual-reading. All are Power Mac native; all support publish and subscribe; all work beautifully with the supplementary programs in the Macworld Office.

If you decide to adopt this suite, you'll have to buy Microsoft Office anyway (and ignore Word 6.0), since it costs less than any *two* of the included Microsoft programs sold separately. Your \$129 expenditure for WordPerfect will buy you a *second* word processor, but it will pay for itself in speed, stability, RAM, hard drive space, and harmony with its suitemates.

Other programs may have longer feature lists, but our candidates have better feature *balance*, maintaining speed, stability, and good design. And that means you just may get home sooner when the day is done and you leave the Macworld Office. **m**



Flying Bullets PowerPoint offers some nice options for bullet "builds": as each bullet arrives on screen, the previous one dims.

Looking It Up FileMaker 3's new relational features mean that as soon as the physician fills in the patient's ID at the top of the screen, all contact and insurance data instantly appear, grabbed from a separate Patient Demographics file. Correct a typo here, and it's corrected in the Demographics file, too.

Contributing editor DAVID POGUE cowrote *Macworld Mac & Power Mac Secrets*, third edition, and wrote *Mac FAQs [Frequently Asked Questions]* (both IDG Books Worldwide, 1996 and 1995, respectively).

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YOU'VE GOT TO SEE IT IN **EPSON** COLOR.™

SUPERCHARGE THE MACWORLD OFFICE
WITH THESE PROGRAMS AND PLUG-INS

OFFICE ESSENTIALS

The Macworld Office—Corel's WordPerfect, Microsoft's Excel and PowerPoint, and Claris's FileMaker—may represent the ideal suite of business programs when it comes to speed, stability, and overall design. But even this handpicked collection of core programs leaves you less than fully equipped to do battle in the business arena. After all, the typical workday for most of us consists of much more than building pie charts, sorting data fields, building presentation slides, and writing reports. Think about how much time you spend juggling dozens of mundane tasks that have nothing to do with spreadsheets or word processing—such as looking up and dialing phone

numbers, opening and closing files and folders, launching applications, finding documents buried in deeply nested folders on a file server, checking your E-mail, consulting your agenda, and scheduling appointments. You may be surprised to find that you spend at least as much time every day handling these little essential jobs as you do actually using your core productivity programs.

That's why the Macworld Office includes not just the standard suite of business productivity applications but also a set of carefully chosen helper programs—software wizards—to handle all the aforementioned office essentials and, in some cases, to automate a wide range of routine and repetitive tasks completely and easily.

The definitive set of wizards includes at least five elements: a calendar program

to track your appointments and to-do items; a contact manager to organize your contacts, as well as dial the phone and print labels and envelopes; a file-management utility to speed up finding, launching, moving, and copying files; a macro program to automate repetitive tasks; and a troubleshooting utility package to handle problems such as bad disks, crashes, stubborn extension conflicts, and files that refuse to open.

Even this more complete package suffers from gaps—such as the need for effective backup and data compression—but it represents the core of what an overall business productivity package should be. (For a detailed look at other useful utilities for more specialized jobs, see "The Right Tools for the Job," *Macworld*, April 1996.)

In our search for the perfect wizards, we employed the same criteria used in picking the four primary components of the Macworld Office—we looked for programs that could handle all the jobs outlined here, with the major emphasis on speed and especially reliability. The last

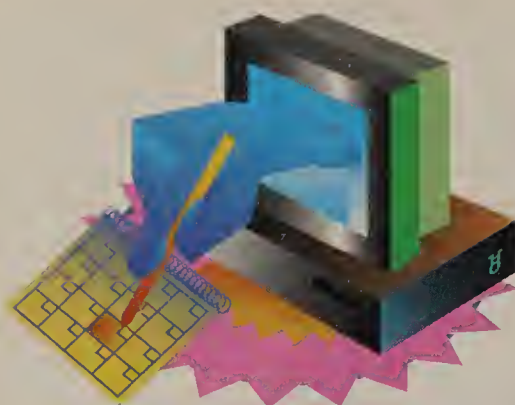
BY JOSEPH SCHORR

thing an efficient office needs is a "helper" that hangs or crashes your system, or fails to work as advertised. (See the sidebar "How to Find the Best Productivity Tools" if you feel inclined to augment our picks with programs for your other productivity needs.) To assemble applications that would function as part of a unified package, we especially sought out programs that integrate well with each other and with the best core business programs available.

We found that some of the choices

were no-brainers; CE Software's QuickKeys, for example, is the hands-down winner if you're looking for an easy way to automate repetitive tasks using macros. Claris's EMailer is a superb commonsense solution to the E-mail complications more and more of us face every day. Picking the best contact manager, on the other hand, was a tough call because to a certain degree, settling on the right choice depends on your personal working style. The following selections, however, represent our top choices for most users.





MAKING DATES

Ideally, a calendar program should be lightning-fast; you should be able to consult your schedule at a moment's notice—in the middle of a phone call, for example—and plug new appointments and to-do items into it quickly. A good calendar program should also make it easy to categorize and locate information and have an alarm feature that can notify you of upcoming appointments, even when you're working in another application.

Now Up-to-Date delivers in all these areas. Elegant and intuitive, Up-to-Date provides beautiful, customizable monthly, weekly, and daily views of your schedule, as well as multiple list views. It allows you to schedule not just the usual appointments and to-do items but also phone calls, meetings, holidays, undated to-do items, specials (identifying a whole day rather than a specific event), and banners (which block out a range of days).

You can assign any of those events to different categories (personal, business, and so on) and then filter the calendar based on those categories so you can view items selectively—a key feature lacking in Claris Organizer and Now Software's DateBook Pro. (Those programs allow you to *find* events by keyword but don't let you selectively hide the events you don't want to see.)

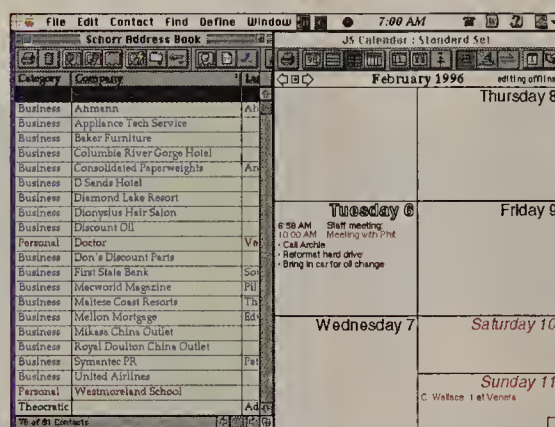
Up-to-Date is also ideal for users who want to share calendar information; you can designate calendar events as either private (appearing on your calendar only) or public (broadcast over the network and stored on a public events server).

But Up-to-Date's strongest selling point is QuickDay, a system extension that allows you to edit your calendar and view the current day's activity without even launching Up-to-Date. QuickDay provides a new menu in the Finder's menu bar so you can tap into your calendar information no matter what program

you're using—without having to wait for Up-to-Date to load up.

QuickNote, a control panel within Up-to-Date, provides yet another way to enter data into the calendar. QuickNote is a small notepad you can summon at any moment (by pressing a key combination) to jot down new appointments, to-dos, phone calls, and reminders. QuickNote is smart enough to interpret dates and words such as *meet*, *visit*, and *call* and automatically add the appropriate type of events to your calendar.

Finally, Up-to-Date integrates superbly with the rest of the Macworld



Drag Someone to Lunch Drag a contact from a Now Contact list (shown at the left) to a date on a Now Up-to-Date calendar (in this case, in the weekly view at the right) to schedule an appointment.

Office. For example, when you drag a block of text from a WordPerfect document onto a date on your monthly calendar, Up-to-Date instantly schedules a new appointment and copies the dragged text into the appointment's description field.

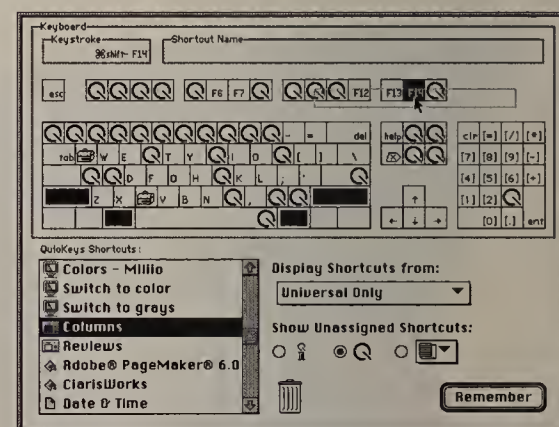


MANAGING NAMES AND NUMBERS

Contact managers range from simple address books to complex multifield databases; the right choice for your office depends in part on the level of tracking your work requires. Do you need to

record detailed information about each client, sorting and extracting data based on a specific set of criteria? Or are you simply looking for a quick and convenient way to look up phone numbers?

For more detailed contact management—the kind that uses data entered into discrete fields to enable sophisticated sorting and searching—we settled on Now Contact, in part because of its tight integration with Now Up-to-Date, our calendar of choice. Admittedly, though, this was a compromise; we found that picking an ideal contact manager is a game of trade-offs.



Take a Shortcut With QuicKeys you can set up custom keyboard shortcuts simply by dragging a command from the scrolling list at the bottom left to the keyboard layout shown at the top.

To illustrate: Now Contact offers superb drag-and-drop capabilities—you can drag a contact record onto your Up-to-Date calendar to schedule a new appointment, or directly into WordPerfect to copy the contents of all the fields into your word processor document—and it has powerful tools for categorizing and selecting groups of contacts. But it provides only eight custom fields. Now Software's TouchBase Pro, on the other hand, lets you create (and rename) 16 custom fields for each record and offers better data-entry shortcuts. But looking up a record in TouchBase Pro takes several times longer, because you have to launch the program to perform the search, while Now Contact handles the lookup through the QuickContact system extension.

Likewise, you can search your primary contact file using QuickContact. It adds a menu containing your most frequently used contacts right to the Finder's menu bar and allows you to search your primary contact file without opening it. And like Now Up-to-Date, Now Contact allows you to designate selected contacts as public, sharing them with other

Now Contact users on a network.

If your contact-management needs don't require the strict structure of a field-based program, consider using Prairie Group's InTouch, a disarmingly simple

free-form contact manager that doesn't force you to plug information into designated slots. With InTouch's Snap control panel (which comes with the program), you can retrieve data from an InTouch

database and plug it directly into another application without launching InTouch.

Finally, Claris Organizer deserves an honorable mention in this category. This fast, simple little PIM lacks the total power of the Now products, but it's very fast, easy to learn, and intelligently designed. If you're on a tight budget and can afford only one PIM that does it all, Claris Organizer, at \$49, is a great option.

TOP COMPLEMENTS TO THE MACWORLD OFFICE

CALENDAR

Now Up-to-Date 3.5

★★★★/8.2 Company: Now Software, 503/274-2800. Company's estimated price: \$99 (bundled with Now Contact). This powerful, sophisticated scheduler is ideal for network users.

CONTACT MANAGER

Now Contact

★★★★/7.3 Company: Now Software, 503/274-2800. Company's estimated price: \$99 (bundled with Now Up-to-Date). Provides fast access to contact information and integrates seamlessly with Now Up-to-Date.

E-MAIL MANAGER

Emailer 1.0

★★★★/8.6 Company: Claris, 408/987-7000. Company's estimated price: \$69. Tears may well up in your eyes when you see how this inexpensive gem automates mail over the Internet and online services.

FILE MANAGER

Now Utilities 5.0

★★★★/7.6 Company: Now Software, 503/274-2800. Company's estimated price: \$89. This classic package can streamline your work with faster access to your frequently used files, folders, and programs.

MACRO PROGRAM

QuicKeys 3.0.1

★★★★/7.4 Company: CE Software, 515/221-1801. List price: \$119. The definitive macro program, QuicKeys is easier to use than its competitors and can reduce a repetitive, multistep process to a single keystroke.

TROUBLESHOOTING TOOLS

Conflict Catcher 3.0.1

★★★★/9.4 Company: Casady & Greene, 408/484-9228. List price: \$99.95. The perfect tool for managing the ever-growing number of extensions that make their way into your System Folder.

Norton Utilities 3.2

★★★★/6.8 Company: Symantec, 541/334-6054. List price: \$149.95. A surprisingly unintimidating tool kit that can work wonders on bad disks, corrupted files, crashed hard drives, and data from damaged files.

OTHER PRODUCTIVITY TOOLS

ACT 2.5

★★★★/6.4 Company: Symantec, 541/334-6054. List price: \$249.95.

Claris Organizer 1.0

★★★/6.8 Company: Claris,

408/987-7000. Company's estimated price: \$49.

DateBook Pro 4.2

★★★/6.9 Company: Now Software, 503/274-2800. Company's estimated price: Disk \$49.95, CD (bundled with TouchBase Pro) \$69.95.

In Control 3.5

★★★/6.5 Company: Attain, 617/776-1110. List price: \$219.95, two-pack \$289.95, ten-pack \$1369.95.

InTouch 2.5.2

★★★/6.9 Company: Prairie Group, 515/225-3720. List price: \$49.95.

KeyQuencer

★★★/5.4 Shareware available online.

MacTools Pro 4.0

★★★/6.7 Company: Symantec, 541/334-6054. List price: \$149.95.

Tempo II Plus 3.0.9

★★★/6.9 Company: Affinity Microsystems, 303/442-4840. List price: \$179.95.

TouchBase Pro 4.2

★★★/6.8 Company: Now Software, 503/274-2800. Company's estimated price: \$69.95 (CD), \$49.95 (disk) (bundled with DateBook Pro).



E-MAIL EXTRAORDINAIRE

If you're among the millions whose daily routine involves going online, opening new E-mail, and sending off replies, there's one more wizard you can't live without: Claris's Emailer, a program that streamlines and automates the process of sending and receiving mail over the Internet and subscription online services.

First of all, Emailer provides a unified front end for all your Internet mail—including RadioMail and accounts on America Online and CompuServe. You can read, sort, write, and send E-mail messages to and from any online service. You maintain just one Emailer address book, shared by all the E-mail services you use. (Unfortunately, Emailer doesn't support key office mail systems such as CE Software's QuickMail and Casady & Greene's cc:Mail.)

Second, Emailer completely automates receiving and sending mail. Once you've configured Emailer to dial in to the services you use (a painless, uncomplicated process), you simply click on the Connect Now button and the program rapidly dials in to each account, retrieves any waiting mail, sends the messages you have waiting to go out, and logs off. Even better, you can use the Auto Scheduler to have Emailer do all this by itself.

You can also save time with the program's Mail Actions, scripts that automatically route and organize your mail based on criteria you define. With Mail Actions

you can have EMailer automatically file messages from your best friend in a folder called Personal, while incoming messages from your boss get routed to a folder called High Priority. You can even set up EMailer to send a prewritten reply to incoming messages.

Once you tap into EMailer's features, the program can save you literally hours every week. It's well worth \$69 to make it a standard part of your office.



HIDDEN LIFESAVERS

Not everyone needs software to manage contacts or schedule appointments—but you'd be hard-pressed to find someone whose office suite wouldn't benefit from a few wizards that work behind the scenes to make all your software operate more productively and solve problems when they arise.

File Manager If you spend any time at all scrolling through Finder windows looking for files or fishing through nested folders to access your work, a file-management package like Now Utilities can change your life.

Now Utilities is a collection of nine System 7 add-ons that pick up where the Mac OS leaves off. For example, while System 7.5 supports a hierarchical Apple menu, with nested submenus five layers deep, Now Menus (one component of the Now Utilities package) allows you to design and install any number of custom hierarchical menus containing exactly the programs, folders, and files you want—and it lets you quickly set keyboard shortcuts for virtually any item on any menu. You can use Now Menus to create a new menu containing links to all the programs that make up your office suite—your own personal version of the Microsoft Office Manager menu that comes with the Microsoft Office package.

While many other parts of the Now Utilities package are terrific system

enhancements (a much-improved Scrapbook, for example), we consider only a handful of the components absolute essentials. But even if you use a fraction of Now Utilities' features, it's worth the estimated street price of \$89.

In addition to Now Menus, another of the package's real gems is Now Super Boomerang, which adds File, Folder, and Drive menus to every Open and Save dialog box on your Mac. The menus provide fast shortcuts back to the files and folder locations you most recently used. You can also add permanent folders and files to the Boomerang menus (and assign keystrokes to them), giving you an express route back to the folders you access the most. If your work requires you to navigate deeply nested folders on several different file servers, Super Boomerang's ability to remember where you've been—and take you back there—is invaluable.

Another navigational tool included in the package is Now FolderMenus, which turns every folder into a pop-up menu. Point to a folder, press a modifier key (which you define), and hold down the mouse button to get a hierarchical pop-up menu showing the folder's contents, up to five layers deep. Not only can you use the pop-up menus to navigate the nested folders, but you can also drag icons onto them in order to move files into the folders listed on the submenus.

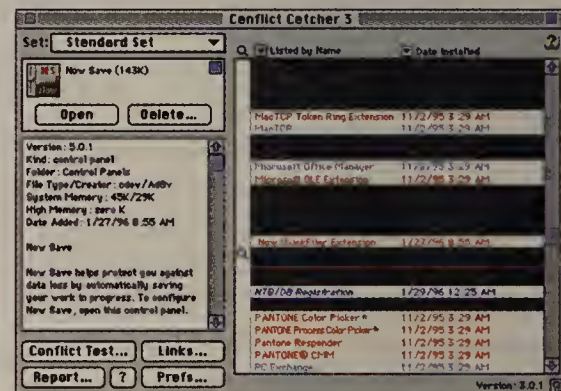
One of the most vital parts of Now Utilities, though, is Key Capture, which records every keystroke you type—no matter what program you're using—and stores the text in a folder called Saved Work in the System Folder. Each day's keystrokes go into a separate file. You get the payoff when your system crashes and you lose your last 20 minutes of work. All you have to do is open the most recent Saved Work file and you'll find every last word you typed—even the stuff you never saved. Now *that's* an office essential.

Macro Program If you're serious about streamlining your work, your set of office wizards must include a macro program. Macros are true wizards, performing long, boring, repetitious operations with a single keystroke. The easiest way to build and run your own macros is to deploy CE Software's QuicKeys, which does more than reduce multistep functions into a single keystroke—it can eliminate keystrokes altogether. Using the program's Timer Options, you can set QuicKeys macros to trigger themselves

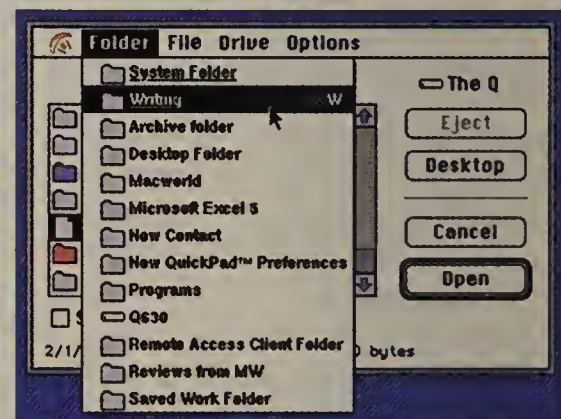
at a specific time. For example, you can have QuicKeys automatically open a FileMaker Pro database, switch to a specific layout, and perform a sort every time you start your Mac.

As for the competition, Tempo II Plus, from Affinity Microsystems, is an even more powerful macro program, but it's also more complicated and more expensive, and its awkward interface makes setting up new macros tedious. KeyQuencer, a relatively powerful shareware macro program, is inexpensive, but it doesn't allow you to *record* macros; you have to program each one manually by typing coded commands.

QuicKeys also includes preprogrammed macros you can invoke to handle routine tasks such as typing the date, changing your monitor's bit depth, or switching between active applications. And it's the perfect tool for switching among all the components of the Macworld Office; you can assign each of your core programs its own QuicKeys macro, and switch between them with a keystroke.



Conflicts of Interest With Conflict Catcher you can list, sort, and color-code all your system extensions to keep track of them. The window at the left details each system component, while the window at the right lists your extensions and enables you to turn them on or off.



Boomerang Benefits Super Boomerang, part of Now Utilities, provides shortcuts back to the file locations you visit most frequently by installing Folder, File, and Drive menus in every Open and Save dialog box.

HOW TO FIND THE BEST PRODUCTIVITY TOOLS

Personal information managers, file-management utilities, and similar products promise to bring calm and control to your otherwise harried existence; just look at the names of the leading programs—In Control, InTouch, Up-to-Date, ACT. Use these programs, the vendors imply, and you'll get your life in order.

Actually, you'll feel neither in control nor up-to-date unless your office suite contains programs that are stable, swift, and easy to use. And bear in mind that many other products more on the fringes of productivity software—from file-compression to backup to RAM-enhancement utilities—are essential for many users. If you really want to be on top of your office work, here are some of the key factors to consider when assembling your own



collection of office wizards or augmenting *Macworld's* picks.

Speed A long list of features often doesn't count as much as sheer speed. This is especially true with calendar programs and contact managers. When you get a phone call, you may need to look up a contact instantly and start taking notes. A sluggish program that keeps you waiting will only frustrate you. The same holds true with file-management utilities: the faster you can put your finger on the spreadsheet

you filed away two months ago, the better.

Stability More features do not necessarily yield more productivity. A complex program that crashes your system every day may actually be costing you more time than it's saving. Choose programs that offer stable, predictable performance.

Integration Look for products that work *together*; think in terms of your whole office package, not just a lot of separate applications. Part of the appeal of the Now Up-to-Date/Now Contact combo is how seamlessly the two programs integrate; you can drag a contact record onto your calendar to set an appointment, for example. If you use a word processor that supports Macintosh drag and drop, such as WordPerfect 3.5, you can drag

text directly from a word processing document into a Now Contact note or into an EMailer document. With Now Menus, you can drop an icon directly onto a custom menu to install it on the menu. That kind of integration really streamlines your work.

Network Awareness A tool that's ideal for a single user may not be the best choice for a work-group sharing information over a network. Calendar programs such as Claris Organizer and Now Software's DateBook Pro, for example, are designed for a single user (though their files can be accessed over a network), while Now Up-to-Date is designed with network use in mind; it allows each user on the network to categorize calendar events as either public or private and supports group-meeting scheduling. If you're primarily working on a network, choose the tools that best handle networking issues.

Troubleshooting Tools Nothing grinds your work to a halt like a system crash caused by an elusive extension conflict, or a SyQuest cartridge that stubbornly insists it is "not a Macintosh disk" when you try to mount it. That's why the ideal suite of business programs should include at least a few essential troubleshooting tools.

To resolve system conflicts, you need an extension manager that allows you to turn the System's various components on and off selectively, so you can track down the extensions or control panels that are causing the trouble. The best program for the job is Casady & Greene's Conflict Catcher. When you start a Conflict Test with Conflict Catcher, the program automatically sniffs out conflicting system components, restarting your Mac repeatedly until it locates the two extensions (or control panels) at the root of the problem.

Even when you're not experiencing a system conflict, Conflict Catcher allows you to view and sort all the components of your system and create customized sets of extensions that you can load at start-up. One of Conflict Catcher's most valuable functions is that it displays the *name* of

each extension and control panel along with its icon during the start-up sequence, so you can at last decipher the meaning of all the icons that line up across the bottom of your screen at start-up.

For damaged disks, you need a set of hard-core repair tools, such as Symantec's Norton Utilities. (Symantec's other data-recovery program, MacTools Pro, is also a respectable troubleshooting program and has the same price of \$149.95, but Norton Utilities handles a wider range of disk-related repairs.) While the process of fixing a disk's mangled extents tree or verifying its Volume Bit Map may sound arcane, Norton Utilities makes the process surprisingly uncomplicated.

Obviously, there are some severely damaged disks—like the one your son dunked in his pudding—that even Norton Utilities won't be able to cure, but the program handles the most common problems quite well. The fact is, damaged disks (or disks that forget they're Mac disks) are usually 100 percent recoverable with this product.

The Norton package contains several other useful tools for dealing with emergencies, including Volume Recover,

a utility for restoring files from disks that crash or are accidentally erased; UnErase, a utility for restoring files that have been trashed; and Recover File, a tool that allows you to open and retrieve data from files that have become damaged.

THE LAST WORD

Combine the best of the wizards we've described in this article with the four other core programs that make up the Macworld Office, and you'll have a software arsenal that outperforms any prepackaged office-software suite on the market. Individually, the Macworld Office programs deliver all of the key features that you need, and with this powerful collection of wizards, they also function together, integrating all of your business applications into a unified work environment. A suite, yes—and sweet, indeed. **m**

JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996), a 1200-page book that he would still be trying to finish were it not for the programs described in this article.

BOOST YOUR PRODUCTIVITY WITH THESE EXPERT TIPS

Here are a few favorites that should save you countless hours of frustration.



TOP TEN TIPS

CLARIS FILEMAKER PRO 3

- ⌘-left arrow to jump to the beginning or end of a line, ⌘-up or ⌘-down to jump to the beginning or end of a text block. Use the option key with the right or left arrow to leap to the beginning or end of a single word; add the shift key to any of these shortcuts to highlight the text over which you're jumping.

- 3. Color Coordinator** Undocumented time-saver: To create that neat-looking shaded background, as seen in professionally prepared FileMaker layouts, you no longer have to draw an enormous rectangle object, shade it, and send it to the back. Instead, just click on a Part tab in your layout—Body, for example—then choose a new color from the Fill pop-up menu (see the screen shot “Colored FileMaker Body Parts”).

- 4. Flexible Text-Box Sizing** As you type information into a text field, FileMaker gracefully expands the box to hold as much as you wish. But the moment you're done, the field snaps into its original, smaller shape, and any overflow contents won't print. If that's your problem, create a layout that uses FileMaker's field-merge capability. Place fields into your layout with the Merge command (⌘-M) instead of placing them as field objects, and FileMaker automatically expands them vertically as necessary so you don't have to

worry that the field box you've drawn may be the wrong size. (Use the handy Slide Up feature to keep lower-down layout objects from encroaching on the higher-up ones.)

5. Layout Frustration Ended In Layout mode, you don't have to completely enclose an object in order to select it if you press the ⌘ key while dragging the mouse.

6. No More Line-Length Tears Many a FileMaker 3.0 first-time user becomes excited about the new built-in word processor, clicks in a layout, begins to type—and then dissolves into sobs of frustration as the line pushes the right edge of the text box farther and farther eastward, never wrapping, all the way to the Atlantic. The trick is to *not* just click and type; instead, drag diagonally to define the text-block width before typing.

7. Dialog-Box Escape Valve When you're deep within the nested dialog boxes of

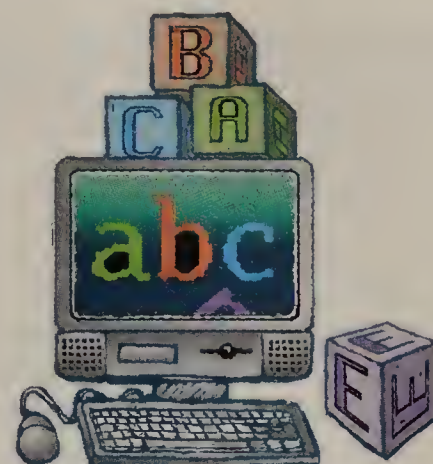
the Define Fields command, repeatedly pressing the enter key OKs and closes successive boxes—except the last one. To close the Define Fields box, press the escape key.

8. Messaging Freebie If you're sharing FileMaker over a network, try this live online messaging system. First share a file that has only one field. Then type a message to your coworkers into this shared field and press enter—instantly, they all see your communiqué. They can respond either by replacing what you typed or by adding to it.

9. Sorting Trick Even in version 3, FileMaker databases don't stay sorted—one of this product's few truly frustrating lapses. If you continue to work with the database after sorting it, your records will eventually pop out of order again. However, if after sorting once you take care to add each new record in its correct alpha-

betical position—by first clicking on the record alphabetically preceding it—you'll always maintain your database's sorted order.

10. Records to Go Strange but true: you can copy and paste entire FileMaker records. Go to the Preview mode, copy the record, then paste it into any other program that recognizes draw graphics, such as a word processor. You get a pasted, editable graphic with fonts, field labels, and everything else intact.



TOP TEN TIPS COREL'S WORDPERFECT 3.5

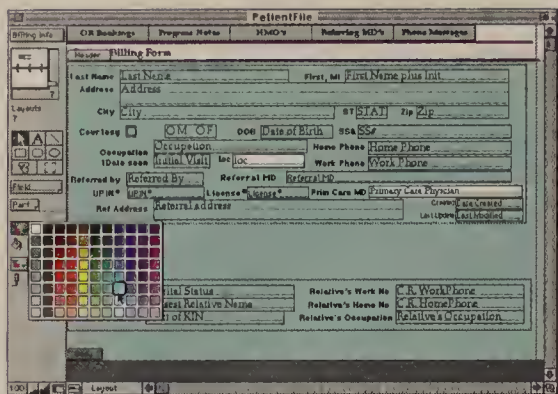
1. Word Highlights Press ⌘-G to find the next occurrence of a highlighted word—no muss, no fuss, no dialog box.

2. Easy Sums If you have highlighted part of a table, you can click on the Sum button on the Table/Math bar to add up the individual columns. But that's nothing new. The trick is to press the option key while clicking on the Sum button—WordPerfect then totals the horizontal rows.

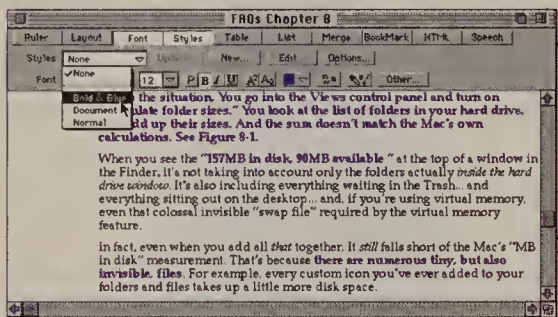
3. Paragraph Style-Setter If you're used to Microsoft Word or another word processor, WordPerfect's habit of applying a new paragraph format to your selection *and to the end of the document* can be extremely disconcerting. To make WordPerfect work like other word processing programs, choose Preferences from the Edit menu, click on Environment, and choose Single Paragraph from the Format menu in the dialog box.

4. Word or Phrase Style-Setter Totally undocumented: WordPerfect offers character styles! That means you can apply your styles to selected words or phrases, not just entire paragraphs. To do so, create and run the following one-line macro: Formatting (Character). Then choose that new macro from the Tools menu.





Colored FileMaker Body Parts Click a Part tab, then choose a color from the pop-up palette.



WordPerfect Character Styles Now you can apply different style sheets to paragraphs, words, or even characters within the same document.

Now, whenever you apply a style, it will affect only the selected text, not the whole paragraph (see the screen shot "WordPerfect Character Styles"). A character style otherwise works just like a regular style sheet—when you update the style, every occurrence of it changes. So that you can flexibly switch back to applying styles a paragraph at a time, create a second macro—you guessed it, Formatting (Paragraph).

5. A Better Clipboard It's the amazing multi-Clipboard! If you highlight some text and press ⌘ -shift-A, the text gets added to WordPerfect's secret *cumulative* Clipboard. After doing this several times, you can choose the Paste command to paste everything at once.

6. Text-Style Tricks Unlike style sheets in other word processors, a WordPerfect style can include *text*. For example, every paragraph in your Legal style could automatically begin with the word *ITEM:* and another style could have bullets or check marks. To set this up, click on New or Edit in the Styles button bar, click on Edit, and then simply type whatever text you want as a prefix.

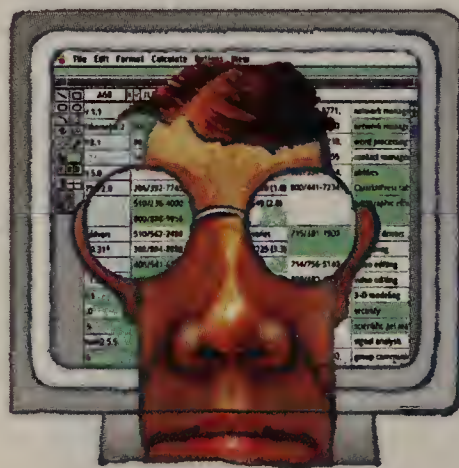
7. Newsletter Help Each month, WordPerfect's staff produces an interesting, funny electronic newsletter, filled with tricks, shortcuts, and cool macros, called WP Mac News. You can find current and back issues on America Online (keyword

WordPerfect) and on the Web (www.network.novell.com/home/man/).

8. E-mail Help If you'd rather not wait for WordPerfect's tech-support telephone line, get your help by E-mail. The address is wpsupport@aol.com (include your serial number or PIN).

9. Flexible Pagination Using the Page Numbers command, you can number your document pages beginning with any number you want. For example, you can call the first page (the *physical* page, in WordPerfect parlance) page 20 (the *logical* page number). To control which number appears on the status bar at the bottom of your screen, click on the tiny triangle at the left end of the status bar, and select either Physical Page, Page/Line (to show the logical page number), or both.

10. Shortcut Cheat Sheet Have all those keyboard shortcuts got you sighing in confusion? Here's the simple solution: Inside your WordPerfect folder, within the Documentation folder, is a Function Keys Template document. Print it, cut it along the dotted lines, and slap it on your keyboard for quick reference.



TOP TEN TIPS MICROSOFT EXCEL 5.0

1. Tool Bar to Palette Tricks If Excel's nine tool bars make you feel understandably claustrophobic, remember that you can turn any tool bar into a floating palette by double-clicking on it. Drag any palette to the edge of the screen and it becomes a tool bar, anchored to the top, bottom, or side of your monitor.

2. Automatic Text Wrap You can wrap text within Excel cells so that the cells automatically grow taller to accommodate all the data entered. To do this, select the cells. Choose Cells from the Format

menu. Click on the Alignment tab in the dialog box and select Wrap Text. From now on, if you edit the contents of a text-wrapped cell or change its width, you can automatically readjust the row height to fit the text by double-clicking on the bottom border of the row heading. With Text Wrap turned on, Excel becomes a fast and efficient tool for editing large tables (and you can export these tables to WordPerfect 3.5 and Word 6).

3. Keyboard Controls You can control every Excel menu from the keyboard. Just press the slash key to enter Alternate Menu mode, which underlines one letter in each of Excel's menus—Microsoft Windows-style. Press the letter indicated to open a menu. (You can also use the arrow keys to move from menu to menu and from command to command.) Each command on the open menu will have a one-letter shortcut; again, press the indicated letter to trigger the command. If the command opens a dialog box, each option in the dialog box can also be activated with a keyboard shortcut.

4. Easier Data Entry If you use Excel to manage database-style lists, organized by columns, save yourself hours of scrolling by editing data using the Form command. When you choose Form from the Tools menu, all the fields in your database appear in a single dialog box, making it much easier to enter data.

5. Universal Shortcut Press the control key when clicking anywhere on the body of an Excel worksheet to reveal a pop-up menu that contains all the essential editing and formatting commands, saving you a trip to the menu bar. Try the same control-click trick on a chart to access a complete set of chart-editing commands (see the screen shot "Hidden Excel Menus").

6. Tool-Bar Controls Press the control key while clicking on any Excel tool bar or palette to open a hidden Toolbar menu. This menu lets you selectively open and close the tool bars you need—or jump directly to the Customize dialog box to create your own, containing only those buttons you really use.

7. Resizing Whiz You can automatically adjust the width of a worksheet column by double-clicking on the right edge of the column heading. The column resizes itself to perfectly fit the longest entry in any cell in that column.

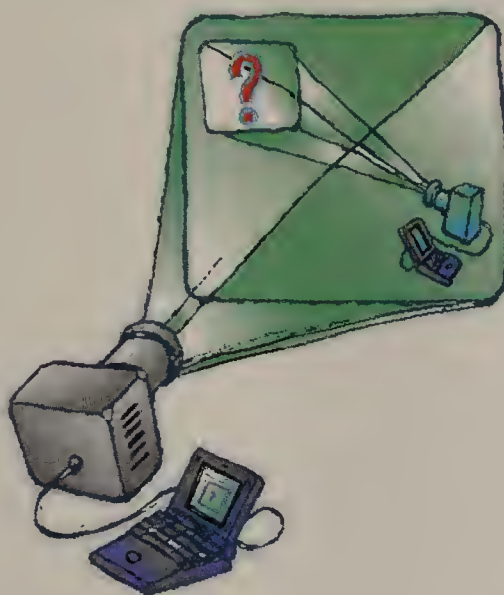
8. Locking Out Errors After you've set up a worksheet, use the Protection command to lock out all the cells except those con-

taining data; that way, you can use the tab key to move between only the cells actually used in your document. To do this, select the cells you want to keep editable, then choose Cells from the Format menu. Click on the Protection tab to open the Protection Options dialog box and deselect the Locked check box. Then choose Protect Sheet from the Protection submenu of the Tools menu to lock out all the other cells. (You can also add a password when you activate protection.) When you return to your worksheet, the tab key will take you only to the cells you left unlocked.

9. Select Cells Quickly Excel provides two ways to select noncontiguous cells: You can hold down the \mathbb{W} key while selecting cells, or you can press shift-F8 once and then start making selections by simply clicking and dragging over any range of cells on the worksheet. That range remains highlighted even when you click and drag to highlight the next range of cells. Using the shift-F8 method, you can also make noncontiguous selections entirely from the keyboard. First, select a range of cells using shift plus any of the

arrow keys. Then press shift-F8. Next, use the arrow keys alone (no shift key) to move to the next range, and repeat the process, pressing shift-F8 once after making each selection. If you follow this process, Excel keeps all the noncontiguous cells selected.

10. Drag-and-Drop Data Entry You can add a new data series to an existing Excel chart by selecting the cells containing the series and dragging the cells onto the chart. The new data gets plugged into your chart automatically.



TOP TEN TIPS MICROSOFT POWERPOINT

1. Easy Views You can switch between PowerPoint's three main views—Slide, Slide Sorter, and Outline—using keyboard shortcuts. Press \mathbb{W} -option-N for Slide View, \mathbb{W} -option-P to access the Slide Sorter, and \mathbb{W} -option-O to view your outline.

2. Hidden Menus By holding down the control key while clicking anywhere within a presentation window, you can access a hidden menu of formatting commands. For example, if you control-click on text, the menu contains text-formatting options, including the Pick Up Text Format and Apply Text Format commands, which let you transfer the attributes of one chunk of selected text to another. Control-click on an object for the Color and Lines command, and control-click on an imported graphic to open the Crop Picture command. Control-clicking on a tool bar pops up a menu that lets you turn tool bars on and off.

3. Text-Box Tactic When editing in Slide View, you can use option-return to jump from text box to text box within a slide—an easy way to move from title to body

text without the mouse. When you reach the last text box on the slide, option-return automatically creates a new slide based on the currently selected template and conveniently inserts the cursor in the first text box.

4. Speed Secret Like most Microsoft programs, PowerPoint becomes unbearably slow when you have lots of fonts installed in your system. For best performance, load only those you need to complete a presentation.

5. Streamlining Outlining When using PowerPoint's Outline view, you can demote and promote paragraphs (from titles to subpoints, to subsubpoints, and so on) by inserting your cursor somewhere within the paragraph and using the tab and shift-tab keys—no need to select the text. You can also press option-shift-up arrow and option-shift-down arrow to move selected paragraphs up or down in the outline (or to change the order of your slides).

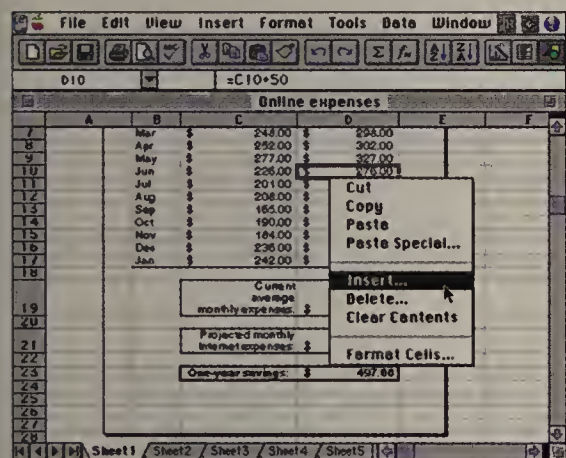
6. Picture Recessing Once you've imported a picture into PowerPoint and resized it, you can restore the picture to its original size and proportions by selecting it and option-double-clicking on one of its resize handles.

7. Thumbnail Identifier Viewing your presentation in the Slide Sorter provides a good overview of your whole project, but on all but the simplest and boldest slides, the thumbnails are generally too tiny to let you read the actual text on your slides. However, if you \mathbb{W} -click on any slide in the Slide Sorter view, PowerPoint displays its title (see the screen shot "PowerPoint Hidden Titles").

8. Slide Jumper When giving a presentation, you can jump to any slide by typing its number and pressing the enter key.

9. Lighting Effects During a slide show, you can temporarily blacken the entire screen by typing B. Typing B again returns you to the current slide. You can also turn the whole screen white using the W key.

10. Tool Bars to Palettes Like Excel, PowerPoint lets you turn its tool bars into floating palettes and vice versa by double-clicking on them. You can also drag a floating palette to the top, bottom, or sides of your screen to transform it into an anchored tool bar. **m**



Hidden Excel Menus The control key is the key to making Excel's hidden, context-sensitive menus appear.



PowerPoint Hidden Titles Can't see what you're looking at? The \mathbb{W} key is the solution.

Contributing editors DAVID POGUE and JOSEPH SCHORR are the authors of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

Heavy-Duty

*Macworld Lab picks the best
laser printers for your
workgroup to count on*

B Y C A R Y L U

D

o you work in a group? Do you print? If you answered yes to both questions, you—and the other people in your workgroup—need a workgroup printer.

A workgroup printer can spit out memos fast enough to get you to your meeting on time, and make them sharp enough so your colleagues will read them. What that means in practical terms is a minimum of 8 pages per minute at 600 dpi, and an Ethernet port to plug in to the office network. In keeping with the Macintosh user's discerning eye, a workgroup printer should provide PostScript Level 2 support. And since most Macintosh workgroups share the office with Windows users, a workgroup printer should switch automatically among all installed ports and print documents in the PCL (Printer Control Language) format, which is common for Windows computers.

To determine the current state of workgroup printers, Macworld Lab rounded up 13 printers that meet or exceed those basic specs—printers that vary greatly in features, price, operating costs, even size: the smallest printer we looked at, the Kyocera FS-1600A, weighs in at a petite 23 pounds; at the other extreme, Hewlett-Packard's big iron, the Edi-

tors' Choice-winning LaserJet 5Si MX, tips the scale at 130 pounds with accessories. We ran all 13 printers through a series of real-world speed tests and compiled performance results. We then gathered a group of art directors, graphic designers, and other print experts to study and evaluate the quality of each printer's output.

Our testing turned up some results that took us by surprise, as well as confirming some old wisdom.

- *Wisdom:* Most printers are either consistently fast or consistently slow across a variety of text and graphics print jobs. Those that are not consistent print text quickly and graphics slowly, because they rely on PostScript-clone interpreters rather than true Adobe PostScript.

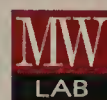
- *Surprise:* Many PostScript printers have a SCSI port for an optional hard drive to store fonts—our tests reveal that adding a hard drive almost never improves printer performance.

- *Wisdom:* Adding RAM can enable specific capabilities, such as the jump from 600- to 1200-dpi output. Otherwise, extra memory has little effect on ordinary printing.

- *Surprise:* Print-quality improvements such as smoothing and halftone enhancement that were valuable in the previous generation of 300-dpi printers provide very little if any benefit at 600 dpi.

- *Wisdom:* When we evaluated output quality, we found that the variation in print quality is much greater for graphics than for text.

- *Surprise:* Some printers produce better-looking output at 600 dpi than other printers do at 1200 dpi.



Printers



Heavyweight Contenders The Hewlett-Packard 55i MX (bottom right) produces great prints at great speed. Lexmark's Optra Lx+ (upper left) is slow for a workgroup printer but produces quality worth waiting for. And the Kyocera FS-3600A's quality leaves much to be desired, but the printer is inexpensive to purchase and operate.

The Race to Paper

Because we expect you'll run your workgroup printer at 600 dpi most of the time, we focused most of our testing efforts on 600-dpi printing.

The HP LaserJet 5Si was the overall speed winner, racing through all seven tests—which included printing text and graphics files—in a total time of 390 seconds. It cranked out a 20-page Microsoft Word document at 3.5 seconds per page—that's almost 20 pages per minute. Several printers followed not too far behind the 5Si on the combined speed tests: the Hewlett-Packard LaserJet 4MV clocked in at 424 seconds, the Apple LaserWriter 16/600 PS at 484 seconds, and the QMS 1660E at 509 seconds. At the back of the pack, the Kyocera models jogged through all the tests, one in 730 seconds and the other in 855 seconds, and the Texas Instruments microLaser came in at 1253 seconds, more than three times as long as the HP 5Si.

Interestingly, the slowpokes lost ground because they print graphics slowly; the variation in speed for printing text was relatively small. For example, Dataproducts' Typhoon 16, the slowest printer in our PostScript-avoiding TrueType text, takes only 1.6 times as long as the fastest printer on this test, the Kyocera FS-3600A.

The spread between fastest and slowest on graphics is much wider. For example, the Texas Instruments microLaser

PowerPro/12 churned away more than eight times as long on a bitmapped image (an Adobe Photoshop file) as did the fastest printer, HP's 5Si. (We tested the Texas Instruments printer with its standard 3MB of memory; all the other printers have at least 6MB.) On a page layout (an Adobe PageMaker file), the slowest Kyocera took nearly four times as long as the fastest printer, which was, once again, HP's 5Si. And to produce an Adobe Illustrator file, the last-place Lexmark Optra Lx+ took more than three times as long as the fastest printer, which was HP's LaserJet 4MV.

Increasing the resolution from 600 dpi to 1200 dpi increased the printing time significantly on graphic images. The Lexmark took almost four times as long to print the Illustrator file—it was already very slow at 600 dpi—and more than twice as long overall for all tests combined. But the QMS 1660E took only 16 percent longer and the Xanté Accel-a-Writer 48 percent longer. Boosting the Xerox 4520mp from 600 to 800 dpi (the printer's maximum resolution) added almost half again the time, a big speed hit for a modest resolution improvement.

Reducing the resolution from 600 to 300 dpi on those printers that support 300 dpi (the Apple, Dataproducts, HP 4MV, QMS 1660E, and Xanté do not) typically cut only 10 to 20 percent off printing times—not enough of a savings to put up with the distinctly poorer-quality output.

But 300-dpi support is not an important feature; all the printers will mostly be run at 600 dpi, with the higher- and lower-resolution output reserved for special cases.

Six of the printers—these from Xerox, Xanté, and Dataproducts, as well as the QMS 1660e and the HP 4MV and 5Si—can print on 11-by-17-inch paper; their speed rankings showed no significant changes with the bigger paper. Printing times approximately doubled on graphics, but text-printing speeds, including those for our Microsoft Excel file, curiously showed little slackening and in some cases were slightly faster.

Hard Drives Don't Help

Does adding a hard drive speed up printing? In a word, no.

Most of the printers have a SCSI port and can accept a hard drive. The idea is that you load all your fonts on the printer's local drive and keep only the screen fonts on your own system, eliminating the need to send the fonts with every document you print.

Back in the days when most offices were running sluggish LocalTalk networks, a hard drive might have made a big difference. But today your office probably runs over Ethernet—all the printers we tested do—and the difference in delivery times over the local SCSI bus versus over the network is negligible. Besides, if you use Adobe Type Manager to render high-quality text on screen, you need the print-

Workgroup Printers Range Widely in Price, Features

Company	Product	Star Rating ^A	List Price/Company's Estimated Price (600-dpi configuration) ^B	Phone	Duplex Option	Largest Paper Size	Tray Capacity, Input/Output (in sheets)
Apple Computer	LaserWriter 16/600 PS	★★★/5.7	\$2429/\$1950	408/996-1010	none	legal	250/250
Dataproducts	Typhoon 16	★★★/5.3	\$3699/\$3150	805/578-4000	none	tabloid ^D	250/500
Hewlett-Packard	LaserJet 4M Plus	★★★/5.2	\$2479/\$1900	408/246-4300	\$679	legal	250/250
	LaserJet 4MV	★★★/6.0	\$3549/\$2900	408/246-4300	none	tabloid ^D	250/250
	Editors' Choice						
	LaserJet 5Si MX	★★★/6.5	\$4899/NA	408/246-4300	\$669	tabloid ^D	1000/600
Kyocera	FS-1600A	★★/3.9	\$2495/NA	908/560-3400	\$982	letter ^{D, E}	250/250
	FS-3600A	★★/4.1	\$4278/NA	908/560-3400	\$982	letter ^{D, E}	250/250
Lexmark	Optra Lx+	★★★/5.8	\$3249/\$2600	606/232-2000	\$639	legal	500/500
QMS	1060E	★★★/5.2	\$2399/\$2000	334/633-4300	none	legal	500/250
	1660E	★★★/5.3	\$3999/\$3400	334/633-4300	none	tabloid ^D	250/250
Texas Instruments	microLaser PowerPro/12	★★/3.3	\$1998/\$1600	817/774-6000	none	legal	500/250
Xanté	Accel-a-Writer 8200	★★★/5.7	\$4495/\$4495	334/476-8189	none	tabloid ^D	250/250
Xerox	4520mp	★★★/5.6	\$4070/\$3643	716/442-4028	none	tabloid	750/500

NA = not available ^A Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ^B Estimated street price provided by ed. ^E Legal-size tray \$49. ^F Two slots available for trays this size. ^G Requires TI's proprietary-format memory chips.

er fonts installed on your Mac anyway.

We tested hard drives on the Apple LaserWriter 16/600 and the Xanté 8200—the latter comes standard with 12MB of memory and is geared toward publishing workgroups, where the largest font collections are found. Our Excel file printed a little faster with the hard drive installed, but most files printed at the same speed, and a Word file with many fonts in it actually printed more slowly.

We did not test one extreme condition where storing fonts on a hard drive might help: when your network is so overloaded that transferring the fonts would be a real burden. If you're facing that situation, you really need to fix your network.

PostScript Level 2 supports a second use of the hard drive. It can cache forms on the disk so that your Mac doesn't have to image them each time they're printed; however, no printer driver or commercially available software takes advantage of this capability.

The QMS printers support a third use of a hard drive, as a repository for spooled data on its way from your computer to the printer. I explain this more in "Software for Special Printing Needs."

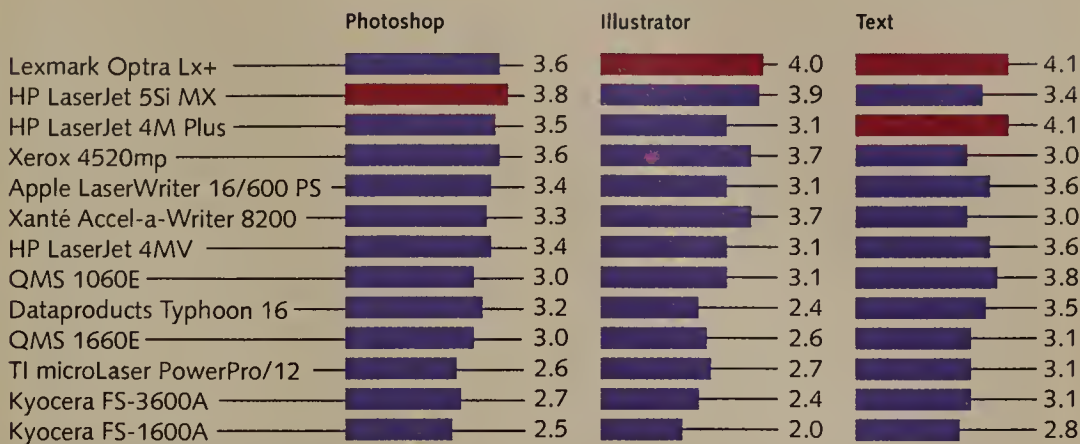
Memory Might Help

Your printer may need extra RAM to support processes that produce bigger files in memory, such as increasing the resolution, running the halftone-enhancement

option, or duplex printing. Otherwise, adding RAM provides no benefit, as we found when we bumped the Apple LaserWriter 16/600 from 8MB to 16MB and the Lexmark from 12MB to 16MB. Also, your graphics department may create files so big that they overload the printer's memory—you'll know you need more memory if those files don't print at all.

Several printers rank consistently near the top for output quality, as judged by our panel of editors and designers. The Editors' Choice Hewlett-Packard LaserJet 5Si MX topped one graphics sample and came in second on the other, but slipped a bit on text quality; for top text quality, HP's 4M Plus tied with the Lexmark Optra Lx+. The Lexmark was also tops on graphics, taking first place in the Illustrator test and second place in the Photoshop test, but it prints painfully slowly, while the 5Si is a speed demon.

■ Best output quality in test.
Printers are listed in order of total output-quality scores.
Longer bars are better.



BEHIND OUR TESTS

Each output sample—including a photo montage, a complex illustration (both shown in this article), and a text document with multiple type styles—was scored on a scale from 0 (worst) to 5 (best). Tests were conducted using double-blind methodology so that neither the testing supervisors nor the judging panel knew which printer produced the output being scored during testing.—Macworld Lab testing supervised by Mark Hurlow and Jeff Sacilotto

Zeroing In on Print Quality

As our panel of experts looked over the test documents produced at each printer's best settings, it became clear that text output varies much less in quality than does graphics output. There are differences—some printers produce darker text and others lighter text—but the Kyocera FS-1600A is the only printer our panel rated as unacceptable on text.

In graphics output, however, many printers still suffer from vertical and horizontal banding, the result of applying and transferring toner unevenly; such banding is not normally visible on text. Some printers can't generate smooth tonal gradations. And only a few can put down dense, uniform black areas.

The Lexmark scored consistently at or near the top on all of our graphics tests. Two HP models, the 5Si and 4M Plus, also did well on all tests. The three poorest performers, the Texas Instruments model and both Kyocera printers, stayed fairly consistently at the bottom of the ratings.

Interestingly, the HP 5Si and HP 4M Plus produce better output at 600 dpi than do the two printers based on the Canon BXII engine, the QMS 1660E and Xanté 8200, at 1200 dpi. This is partly because the Canon BXII cannot produce high-quality blacks, and partly because

Add-on Tray Capacity, Input (in sheets)/Cost	Add-on Tray Capacity, Output (in sheets)/Cost	RAM (base/maximum)	Maximum Resolution (in dpi)	Footprint ^c (in inches)
500/\$299	NA	8MB/32MB	600	19 × 37
500/\$745, 250/\$300	NA	12MB/68MB	600	26 × 52
500/\$445	1000/\$349	6MB/38MB	600	16 × 17
500/\$445	NA	12MB/44MB	600	25 × 42
2000/\$1299	2600/\$1899	12MB/132MB	600	35 × 47
500/\$365 ^f , 150/\$275	1250/\$2135	6MB/66MB	600	18 × 36
500/\$365 ^f , 150/\$275	1250/\$2135	6MB/66MB	600	18 × 36
500/\$349, 150+150/\$399	NA	4MB/64MB	1200	20 × 32
500/\$289	NA	8MB/64MB	600	19 × 29
500/\$228	NA	12MB/64MB	1200	20 × 41
NA	NA	3MB/19MB ^g	600	13 × 14
500/\$563	NA	12MB/64MB	1200	25 × 42
1500/\$560	NA	8MB/52MB	800	21 × 17

company; actual price may be higher or lower. ^c Includes room to remove trays. ^d Maximum paper size slightly larger than indicat-

Software for Special Printing Needs

The heavy-duty workgroup printers we looked at all come with the essential software necessary for workgroup operation—a printer driver. Many workgroups will need no other software. But if your workgroup has to keep track of who prints what, there are several software packages that can help out.

Print Servers

When you print, your computer can usually generate data faster than the printer can handle it, so PrintMonitor, which comes with all Macs, caches the data and parcels it out as the printer is ready. When you're performing typical office tasks, the impact of background printing on performance is barely noticeable, but computation-intensive applications suffer from the distracted processor.

A print server reduces or eliminates background-printing overhead and performs other printer-management chores, the most important of which is print spooling. Your computer sends (spools) a print job to the print server instead of directly to the printer—the limiting factor on regaining control of your Mac becomes the zippy network instead of the poky printer.

Print servers have a number of other capabilities. They can maintain a print queue for each printer and send print jobs to the least busy printer. If a printer needs service, the system administrator can redirect jobs from its print queue. A low-priority print

job can be deferred until after work hours. Font management makes sure that the printer has the fonts required for each print job. The server can also track who prints what, for billing or cost tracking. And frequently printed pages can be stored on the print server and reprinted without requiring the original application and file.

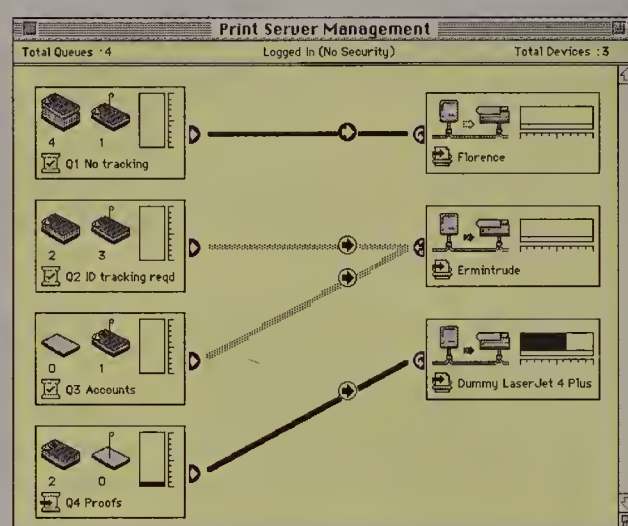
Three companies sell Mac print servers. Cooperative Printing Solutions sells Printdesk Server (\$795; 770/840-0810, info@copstalk.com). Luminous sells Print Central, until recently an Adobe product (\$795; 206/689-

MacJANET, from WATNET Technologies (\$1295; 519/888-6700, info@watnet.uwaterloo.ca), is a full file server, providing print serving along with electronic mail, program usage tracking, and program encryption. Its print server features, which were developed for managing a university computer lab, give an administrator control of processing time and page counts for each user.

AppleShare (about \$1000), from Apple, includes a simple printer spooler that does not perform load balancing or usage tracking.

ple, DeskTracy (from KansasBay Systems; \$495 for five users; 415/788-8788, kansasbay2@aol.com), was originally developed for Kinko's copy centers. DeskTracy counts all pages printed, displays current charges, and locks folders against changes. An administrator program can limit access to printers.

Working Software's Working PrintLogger (\$99.95; 408/423-5696, info@working.com) keeps a record of all print jobs run from a particular computer. Working PrintStamper, included with Working PrintLogger, puts the same print-job information on



Print Servers Optimize Printer Use A print server guards print jobs from colliding by providing safe refuge while the printer is busy. Some print servers, including 4-Sight's HotSpools (left) and Print Central from Luminous, can be con-

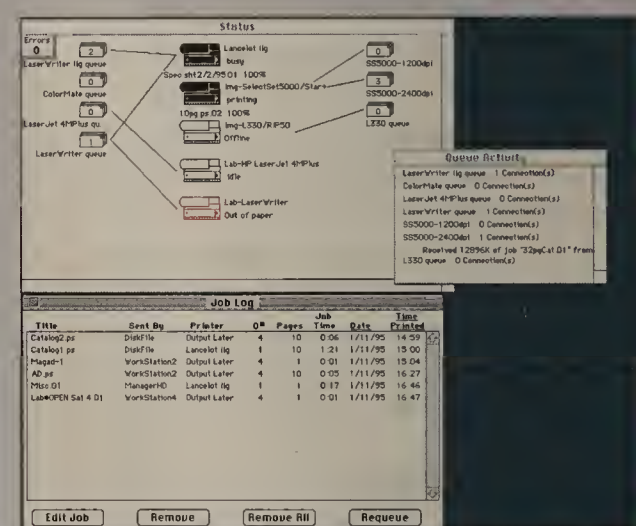
6736, sales@lumcorp.com). 4-Sight LC offers HotSpools (\$995; 515/221-3000). The three products differ in only minor ways. When the server redirects a job to an unoccupied printer, Print Central and HotSpools inform you; with Printdesk, you have to look on a network administrator's screen to see where the job went.

laser printers simply can't achieve clean 1200-dpi resolution.

The quality of the page the printer delivers depends on several factors, some of which are within your control. For example, high-quality paper designed for laser printers, with greater opacity and higher reflectivity, makes a distinctly better impression, particularly for graphics.

Another factor within your control is the toner cartridge. Cartridges do vary in quality, so you might reserve a good cartridge for special jobs. In some cases a refilled cartridge may perform better than a new one. And don't be shy about experimenting with toner density settings, especially when printing graphics.

Output Enhancement: Still Useful?



figured to redirect print jobs from busy to idle printers; when a printer becomes disabled (for example, the red printer at the bottom of the Print Central screen is out of paper), you can simply drag the arrow to redirect the jobs in its queue.

A printer can also run its own spooler. Of the printers tested here, only the QMS models support this feature—another use for their optional hard drives.

Other Printer Software

Some utility programs sit on each user's computer and track printer usage. The most elaborate exam-

each printed page to simplify document tracking.

SmartStuff (503/231-4300, sales@smartstuff.com) sells a modified version of Working Software's toner-saving utility, Toner Tuner. The SmartStuff version, Toner Tuner Secure (\$39), adds a toner-usage setting that a system manager can lock.

Many printers include options to enhance output, but like adding a hard drive to a printer, this technology's time has mostly come and gone. The simplest—variously called Fine Print, Resolution Enhancement, or Smooth Print—smooths text and line art during printing without slowing down the printer. It distinctly improves 300-dpi printing, but at 600 dpi,

the effect is so subtle that most people won't notice the difference.

Gray-scale or halftone enhancements manipulate dot size and placement to produce more levels of gray, also without affecting speed. Again, this clearly helps 300-dpi printing, but at 600 dpi it is subtle at best.

Those printers that have *adjustable* halftone settings, on the other hand—the two QMS models and the Xanté—do offer a key advantage for careful graphics proofing. If the file is destined for an imagesetter, it should be adjusted for optimum imagesetter output, which won't necessarily be optimum for a laser printer. Laser printers with adjustable halftone settings can adapt imagesetter-destined files to produce the best quality laser output. But don't expect any dramatic improvements; even with this flexibility, laser printers can't produce good halftones.

Print Quality Maxing Out Black-and-white laser printer technology is approaching maturity. Although prices will likely continue to decline slowly in coming years, the print quality will not improve greatly in the foreseeable future. Aside from fixing banding and imperfect blacks, there isn't much left to do. Twelve hundred dpi already exceeds the resolution limits of the technology—there is no way to produce a cleanly defined dot with a diameter of $\frac{1}{1200}$ inch on plain paper. A laser-driven imagesetter, which uses photographic imaging, can produce clearly defined dots that size and smaller without difficulty. Of course, you cannot use imagesetter film like paper, but for documents that go to offset printing, no laser printer will ever compete with an imagesetter.

Paper Versatility

Seven of the printers accept only letter- and legal-size paper and their metric equivalents, A4 and B4. If you don't need to print on larger paper, you can save both money and tabletop space with one of these smaller printers. (For legal-size printing, the Kyocera printers require a \$49 paper tray.)

The other six printers can also print on 11-by-17-inch paper. Although you may not need to print on double-size paper often, it comes in handy for spreadsheets and business graphics such as organization charts and schedules, and of course it's indispensable for proofing page layouts.

If you use your printer for proofing layouts, the closer to a full bleed you can get, the better. None of the printers can print to the edge of any size paper, but the Xanté can come within $\frac{1}{12}$ inch on letter-size paper; the others leave $\frac{1}{8}$ inch—except for the HP 4MV, which stops almost $\frac{1}{2}$ inch from the edge.

The printers based on the Canon BXII engine (the Dataproducts and Xanté printers and the QMS 1660E) can print on 11.8-by-19-inch paper, which can give you 11-by-17 full bleed if you don't mind trimming the edges at the paper cutter. Xanté goes one step further by offering a proprietary modification that will take 12.08-by-25-inch paper; this factory modification requires a modified toner cartridge, and you'll probably have to special-order the paper.

Paper Handling All the printers have at least one paper tray that holds 250 sheets, and an easily accessible manual-feed slot (except for the Xerox, which has its slot in the back) that holds anywhere from 1 to 50 sheets. There are optional paper trays available for all the printers; they may slow things down because the paper must follow a longer path to the printing engine. Lexmark offers an unusually wide range of op-



Apple's Entry Apple's LaserWriter 16/600 PS is among the least expensive printers but is in the middle of the pack on quality and performance.

tional trays for different weights of paper.

All the printers share a design flaw: the input tray holds far more paper than the output tray. When the output tray is full, the printer may jam—only the HP 5Si, Lexmark, and Xerox have a sensor that halts printing. As a result, you can't start a very large print job and head off for lunch. The HP 5Si and Kyocera printers offer optional output bins for this problem; the printer driver lets you select bins for each print job, or send all your print jobs to one specific bin.

Text Quality Compared

THE HEWLETT-PACKARD 4M PLUS WON THE top score on text quality. At 600 dpi, its characters have well-defined edges; stray toner splatter is visible only in the magnified view. The last-ranked Kyocera FS-1600A's characters have smeared edges, even at 600 dpi, while text looks heavy—note that L and A touch. The printer's unusual engine is based on an LED array, which is not as precise as a scanning laser beam.

THE LAZY DOG

LA

Imagesetter

THE LAZY DOG

LA

Hewlett-Packard 4M Plus

THE LAZY DOG

LA

Kyocera FS-1600A

Workgroup Printers: Most Are Fast Enough to Share

■ Best result in test.

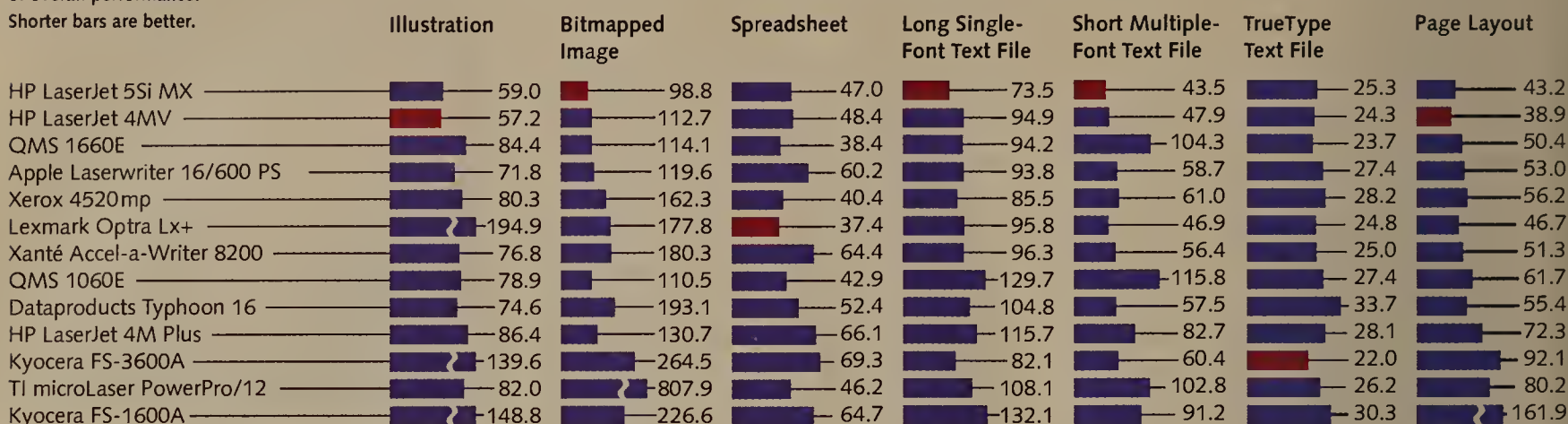
All times are in seconds.

Printers are shown in order of overall performance.

Shorter bars are better.

How fast a printer cranks out pages depends on several variables, including whose PostScript it uses, how efficient its driver is, the engine's raw speed, and of course the kind of

file printed. Results shown below capture real-world performance on a variety of file types, including graphics, page layouts, word processing files, and spreadsheets.

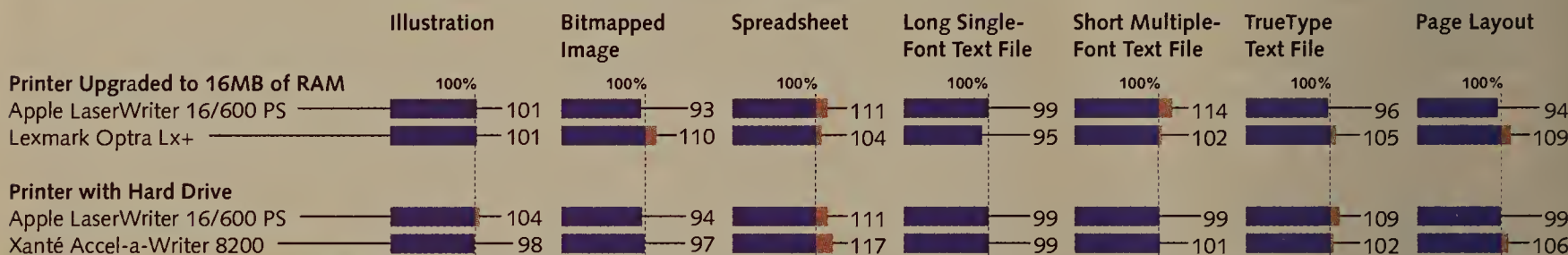


What Good Is Souping Up a Printer?

Speed shown as percentage of speed of standard configuration. (Less than 100% = slower than standard configuration.)

We found that extra memory provides almost no improvement in speed—on a few tests the printers even run more slowly. Our advice: Add RAM only if needed to enable higher resolution or to cope with files that overflow the standard configuration;

otherwise, save your money. As for adding a hard drive for fonts, ostensibly to reduce font traffic on the network, our testing shows that's a complete waste—if your network is bogging down, you need a faster network.



BEHIND OUR TESTS

All timing tests were conducted by sending files to printers over Ethernet from a Power Macintosh 7100/80 with 24MB of RAM and a 700MB internal Quantum LPS 700 drive. Times are shown for the fastest configuration tested—resolution enhancement, use of Apple's printer driver or vendor's driver,

and other configuration changes had minor impact on some print speeds. Except as noted, all printers were tested with standard memory.—Macworld Lab testing supervised by Mark Hurlow and Jeff Sacilotto

The Apple, HP 4M Plus, and Lexmark input trays indicate how much paper remains, alerting all who walk by when it's time to replenish the paper supply. When the paper does run out, only the computer sending the current job gets a message; other computers trying to print get a message that the printer is busy.

Envelope Printing Still Iffy Laser printers still don't handle envelopes gracefully. Nearly all the printers we looked at can print on envelopes (QMS recommends against doing so on the 1660E), but with some complications. If you put a single envelope in the manual-feed tray, it travels a U-shape path. Thin, cheap envelopes pass through fairly well, but envelopes made of heavier stock often get wrinkled. The printers that offer a straight-through paper path option if you fold down a paper guide will not usually wrinkle envelopes—but the straight-through path stacks the output in reverse order. And of course, on a busy printer you have no way of knowing whether

your print job or someone else's will be printed when you change the paper path or feed in an envelope. Window envelopes, a label printer, that old IBM Selectric gathering dust, and even a ball-point pen are still better envelope solutions than a laser printer.

The manual-feed tray should accept a small stack of envelopes, and there are envelope feeders available for most of the printers (not for the QMS 1660E, the Xanté, or the HP 4MV). But feeders are expensive and may not solve the wrinkle problem, and in any case, envelopes by their nature are more likely to jam than ordinary paper.

Printing Front and Back The HP 4M Plus and 5Si, Kyocera, and Lexmark printers have duplex options available. Though they add to the printer's initial cost, duplex printing saves paper, document storage space, and mailing costs. (Any single-sided printer can print duplex if you print the odd-numbered pages first, flip over and reorder the pages, and then

print the even-numbered pages. It's easier if the printer driver can switch between face-up and face-down output, which reverses the page order for you. But you may end up with someone else's print job on the back of yours.)

Perfect Clone PostScript? Not Yet

Kyocera, Lexmark, and QMS use their own versions of PostScript; the clone software is responsible for slow graphics printing on the Lexmark and Kyocera printers. The QMS PostScript clone turned in the one clear error in our testing, an Illustrator gradient that failed to render correctly on the QMS 1660E. QMS has a workaround (under the File menu in Illustrator, select Compatible Gradient Printing in Document Setup). Curiously, the other QMS printer printed the same image correctly. The Texas Instruments PowerPro/12 has an odd, very minor bug: it prints Photoshop images at 600 dpi even when it's set for 300 dpi.

The Real Cost of Printing

A printer's purchase price is only a part of the overall cost—a rather small part if you print a lot of pages. For 500,000 pages (10,000 pages a month for four years), the typical operating cost for these printers runs about \$15,000, or 3 cents a page (not including paper). Most of this goes for toner cartridges; a typical toner cartridge, at \$100 to \$200, is good for 5000 pages and incorporates a photoconductor drum that you discard with the cartridge. Kyocera's printers are the only ones of the batch designed for a low operating cost—\$4500 for 500,000 pages, or only 0.9 cents per page. Kyocera's trick is a separate, 300,000-page photoconductor drum that costs \$850 and a \$70 toner cartridge good for 10,000 pages.

However, since the Kyocera printers' output quality hovers near the bottom of the pack, you sacrifice a lot for the savings. There are other ways to reduce toner costs. Many small companies refill spent cartridges and sell them for half to two-thirds the price of new cartridges—over the course of 500,000 pages, that cuts the cost to 1.5 cents per page. The other way to cut costs is to use less toner. All the printers except the Texas Instruments, Xanté, Apple, and Xerox have a reduced toner setting that produces grayish but legible pages, adequate for many uses.

You can also use a PostScript utility such as Toner Tuner (\$24.95; Working Software, 408/423-5696) to limit toner consumption. A utility is easy to use but operates only on PostScript pages; a printer setting will work on all pages, PostScript or not, but won't automatically switch back to full toner density for the next print job. A printer server can also manage toner consumption (see "Software for Special Printing Needs").

The best way to save printing costs is to print less. Back in the early 1980s, computers were supposed to herald the advent of the paperless office—but then laser printers and fax machines joined copiers and a ten-year paper blizzard blew in. Now, technology for reducing paper consumption really works. Electronic mail can replace fax and paper memos in many circumstances. You can post longer documents on an internal Web site or a Lotus Notes server. Electronically distributed documents don't require paper when they're first distributed, nor when they're revised. And when someone on your distribution list really does need a paper copy

of a document, he or she can always send it to the printer.

Keeping a Printer Online

Overall, laser printers have proved to be reliable products. But a heavily used printer does require routine maintenance and cleaning. Some companies have an IS staff to overhaul and repair printers. Unfortunately, most printer companies, like most computer companies, refuse to sell service manuals—how different from the consumer-electronics and automobile companies! The only logical reason for this is to preserve revenue from maintenance contracts and authorized repair centers. Dataproducts, Lexmark, Texas Instruments, Xanté, and Xerox do offer

service manuals and should be applauded for doing so. If no manual is available for your printer, another vendor whose printer uses the same print engine may be able to supply one.

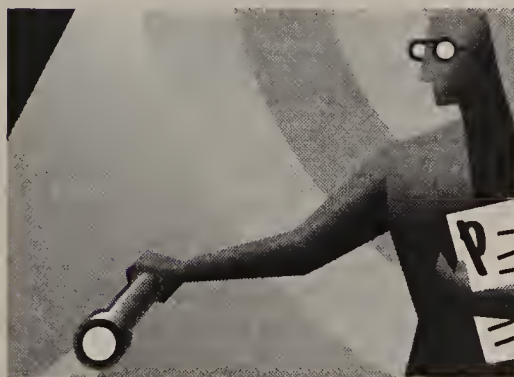
Can you get supplies readily? Supplies for the Canon printer engines are the easiest to find, since Apple, HP, and others use these engines; cartridges and many paper-handling supplies are interchangeable among models that share the same engine. For popular models you can get colored toner cartridges, one way to make your printed pages stand out. For printers based on less-popular engines, you may have to special-order even routine supplies, and refilled cartridges may not be available. Check around for sup-

PostScript Graphics Output

THE 1200-DPI LEXMARK OUTPUT WAS RATED highest for this test; it shows the slightly uneven tones characteristic of laser printers, but is largely free of banding and other printer artifacts. Dataproducts' Typhoon 16 ranked in the middle on this test; its image is marred by vertical streaking and fewer halftone steps.



Imagesetter



Lexmark Optra Lx+



Dataproducts Typhoon 16

The QMS 1660E incorrectly rendered the surface of this cylinder in another part of our PostScript test file, revealing the inside; this is probably due to its non-Adobe PostScript.



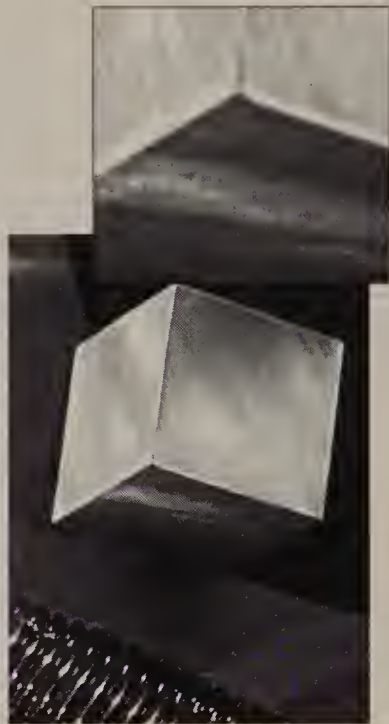
Imagesetter



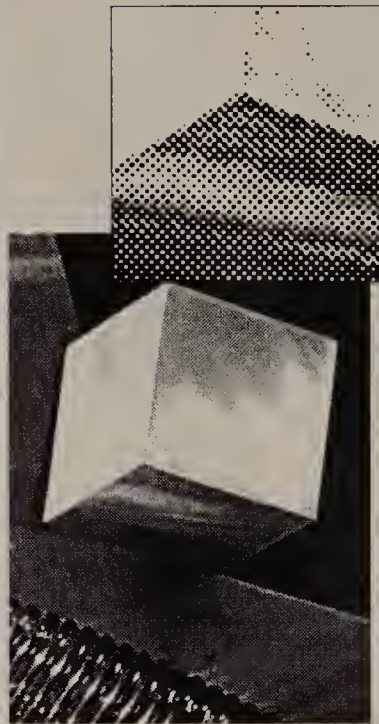
QMS 1660E

Bitmap Graphics, with Detail

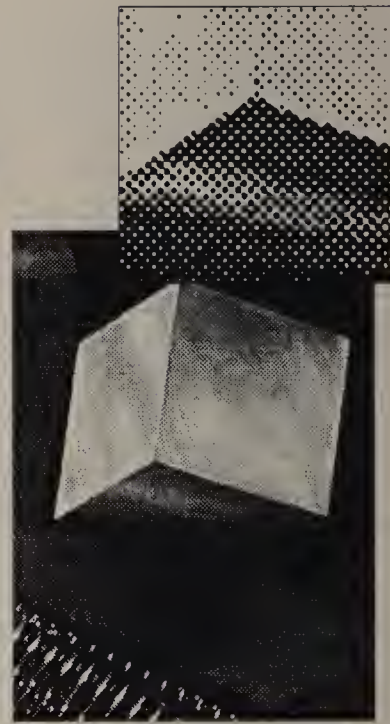
THE TOP-RATED PHOTOGRAPHIC-image printer, Hewlett-Packard's 5Si MX, does a creditable job of reproducing a photograph. The Texas Instruments printer, which came in at the bottom, suffers from banding. The TI's toner spreads out, producing a heavier appearance and turning dark grays into blacks, as seen at the bottom of the cube. Banding is caused by uneven rotation of the toner drum during exposure to the laser beam, while streaking (banding in the direction of paper travel) results mostly from irregularities in fusing toner to paper. (Images shown at 300 percent magnification.)



Imagesetter



Hewlett-Packard 5Si MX



Texas Instruments microLaser PowerPro/12

pliers before you buy a printer if you have any doubts.

With a single exception, you can add standard RAM SIMMs to expand printer memory; the exception is the Texas Instruments printer, which uses a custom RAM configuration.

The Last Word

If price and size are no object, then go for our Editors' Choice, the Hewlett-Packard 5Si MX. It's big and expensive, but it's the fastest printer we tested and came in second in the quality rankings. The Lexmark won the quality rankings, but it is too slow overall, especially for graphics. For general use with essentially no speed penalties, the HP 4M Plus performed closely behind the HP 5Si. The Xerox 4520MP also did well in both speed and quality and comes standard with three input trays, but its Fuji-Xerox engine is not as common as the Canon engines.

Among the smaller printers, the Apple LaserWriter 16/600 and the HP 4M Plus tied for print quality, which seems reasonable since they both use the same Canon engine. The LaserWriter is about 20 percent faster but has uninformative lights instead of a display panel. I'd give the nod to the LaserWriter by a very slight margin.

The Xanté 8200 stands out with its

unusual support for large paper sizes (up to 12 by 25) and enhanced halftone output at 1200 dpi. Although the slightly ragged printing of its Canon BXII engine kept the Xanté out of the top tier for quality, it actually puts more information on a page than any other printer. Xanté targets the experienced graphic arts user looking for a proofing tool. (Xanté has recently introduced the 8300, a somewhat slower and less expensive printer with the same general features and a new Canon engine that appears to be free of the BXII's blemishes. We were unable to test the 8300.)

The Kyocera printers really do cost much less to operate and can print text at a decent clip. But their print quality and slow graphics printing leave much to be desired. (Kyocera says that its new FS-1600+ and FS-3600+ models, which will replace the models we tested, offer improved print quality. We were not able to test these new models.)

Here's an important question to consider: Should you buy one fast, expensive printer or two slower, cheaper ones? Two Apple LaserWriter 16/600's printing simultaneously are faster than one HP 5Si MX, cost about the same, and take up about as much room. But you lose the option to print on 11-by-17-inch paper. On the other hand, printing is so critical

in the modern office that you should always have a backup printer, if not in your department then somewhere nearby and accessible on the network.

Multiple printers also make some features such as manual-feed trays and envelope printing more practical to use—designate one printer for the special print jobs. A second printer in a private area is also useful for printing sensitive documents that you don't want anyone to walk off with, accidentally or otherwise. **m**

CARY LU has researched visual acuity and perception at Bell Telephone Laboratories and the California Institute of Technology.

WORKGROUP PRINTERS



Speed and output quality are the marks of distinction for a busy, shared printer. A relatively high purchase price sounds less daunting when you calculate the cost on a per-user basis.

★★★/6.5 **LaserJet 5Si MX** The fastest printer in almost every test was also near the top in output quality. The 5Si can print on 11-by-17-inch paper, and offers a great variety of paper-handling options. **Company:** Hewlett-Packard. **List price:** \$4899.

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In the May issue of *MacUser* magazine, the editors put the ViewSonic PT810 through its paces and reported: “[W]e were in for a surprise with this month’s top performer, the 21-inch ViewSonic PT810. It boasts image quality so good that even demanding graphic artists and desktop publishers will be pleased.” They concluded by awarding it their high 4-mice rating.

Jerry Pournelle, a featured columnist for *Byte* magazine, stated in the April issue, “The User’s Choice Award for this year goes to the ViewSonic Professional Series PT810...” Discussing the PT810 in the March issue, he said, “You’ll have to fight me to get this

monitor away from me. I am literally sitting here wondering how I got along without it all these years... Highly recommended.”

	SonicTron Professional Series		SonicTron Graphic Series	
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CRT Size	21" (19.5" viewable)	17" (16.0" viewable)	20" (19.1" viewable)	17" (15.9" viewable)
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Secrets

Matters of Preference

THE VOLATILE WORLD OF PREFERENCE FILES

by Joseph Schorr

No one else has a Mac exactly like yours. From the pattern on your desktop to the size of the icons in your list views, you've tweaked your Mac from top to bottom to fit your own personal work style. Most likely, you've spent a fair amount of time doing so. That's what gives your Mac its unique look and feel; that's what makes it *yours*. And that's why preference files—where all those settings are stored—are so important. These files may seem insignificant, as they lurk quietly in the oft-ignored Preferences folder within the System Folder, but they contain data worth protecting. Think about the time you've spent customizing the layouts, fonts, styles, and default settings in your word processor or contact manager.

Furthermore, those innocent-looking files are notorious for becoming corrupt and generating a cornucopia of errors and system bombs. Here's a crash course in preference-file awareness, with tips on how to protect the files you don't want to lose and troubleshoot some preference-related problems.

The Darker Side of Preferences

When you launch a program—including the Finder—the Mac almost always checks a preference file to determine which settings to activate. Just one glitch in one preference file can nuke an entire program—or your entire system.



A Hint of Corruption If a program suddenly starts generating errors, your Mac is probably the victim of a corrupted preference file. To fight this form of corruption, try dragging the preference files for that program to the Trash and relaunching the program. Most preference files are stored in the Preferences folder and have names that identify the parent program. (If you can't find the right one, use Find File to search by creator and type: drag the program's icon onto the creator criteria pop-up to enter the right creator code automatically; enter **pref** manually in the criteria pop-up.) When the program goes to check for preferred settings and finds no preference file, it creates a new one. This simple technique often solves the problem—and saves you the trouble of reinstalling a

whole program from scratch (see "Fighting Corruption"). The converse is also true: reinstalling a whole program may *not* solve a problem unless you remove the program's old preference file.

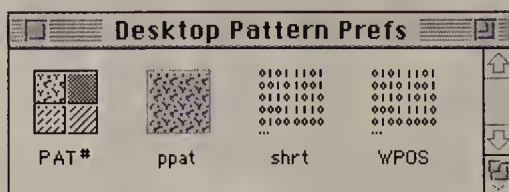
Bloated Prefs Syndrome Most preference files are small—the 59 files in my Preferences folder add up to only 436K—but certain types of preference files can take up quite a bit of space. CD-ROM caching programs, such as Charis-Mac's CD AutoCache, use the Preferences folder to store complete directories for each CD-ROM you mount. These directories can be huge, and they add up quickly, especially if you use a lot of CD-ROMs. Netscape Navigator also stores its cache files in the Preferences folder.

Another overlooked preference file is
continues

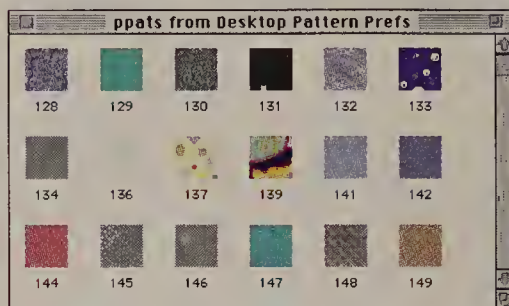
Preferential Treatment

One of the largest of the preference files on your Mac is the Desktop Pattern Prefs file, which stores all of the desktop patterns available on your system. If you're a desktop pattern fanatic, you can duplicate this file and create multiple desktop pattern libraries, which can be stored offline, distributed on floppy disks, and so forth. When you are ready to switch to a new desktop pattern collection, you simply drag the file you want to activate into the Preferences folder and make sure it's named Desktop Pattern Prefs file.

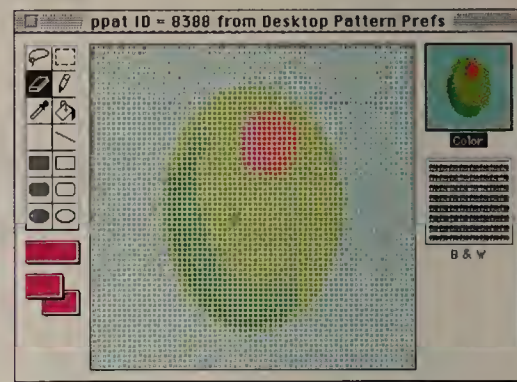
Open this file with ResEdit (Apple's resource-editing utility), and you can delete patterns you don't use—dozens at a time—without having to erase each pattern individually with the Desktop Patterns control panel. In fact, using ResEdit you can actually customize the standard desktop patterns—or create your own with ResEdit's built-in painting tools.



1. Open the Desktop Pattern Prefs file (not the Desktop Patterns control panel) with ResEdit. Double-clicking on the ppat resource icon accesses your system's desktop patterns.



2. Each desktop pattern is a separate ppat resource. Double-click on one to edit it.



3. ResEdit's pattern-painting window provides a complete set of tools for fiddling with existing patterns or drawing new ones.

4. When you're done, save your changes.

Remove dozens of desktop patterns at one go in ResEdit: shift-click to select each unwanted ppat resource (in the ppat resource from Desktop Pattern Prefs window), and press delete.

Desktop Pattern Prefs, which stores your desktop patterns. If you add lots of new patterns using the Desktop Patterns control panel, this prefs file becomes bloated. If you're short on hard drive space, keep Desktop Pattern Prefs lean (see "Preferential Treatment"). Also, browse the Preferences folder every now and then, dumping files from programs you no longer use and purging cache folders.

Keeping Preferences Safe

There's only one problem with the drag-your-preferences-to-the-Trash approach. All the adjustments and tweaks you've made to your programs vanish forever. That's why, as a rule, you should *back up all your preference files*—especially items such as the Users & Groups Data File, which contains information that can be laborious to reconstruct. That way, if you have to drag corrupt files to the Trash, you can reinstall clean backup copies of your preference files, preserving all your custom settings. Preference files are small enough that you probably can back up your entire Preferences folder on a single floppy disk—a simple task that can save you hours of work in the future. **m**

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

FIGHTING CORRUPTION

When preference files go bad, they produce a variety of pesky problems. The solution is simple: get rid of the corrupted file and restart. The affected program creates a new preference file.

FINDER PREFERENCES

Symptom: On start-up you get a system bomb or a completely blank menu bar, or an empty dialog box shimmering ominously at the center of the screen. **Likely Culprit:** The Finder Preferences file. **Solution:** Restart from another disk—such as the Disk Tools disk or the system software CD-ROM that came with your Mac. Drag the Finder Preferences file from the Preferences folder, in the System Folder on your normal start-up disk, into the Trash. Now restart from your hard drive. The Mac creates a new Finder Preferences file. (If this doesn't solve the problem, then the Finder itself is probably damaged, and you should reinstall your system software.)

Symptom: The Finder won't retain custom settings: for example, you turn off the Trash's warn-before-emptying dialog box, but in your next work session it's back. **Likely Culprit:** The Finder Preferences file. **Solution:** Trash the Finder Preferences file. **Techie Note:** It's a common misconception that Finder settings are stored in PRAM, a small chunk of memory powered by your Mac's internal battery. Many systemwide

settings are stored in PRAM, but Finder-specific settings are in Finder Preferences.

FILE-SHARING PREFERENCES

Symptom: File sharing suddenly refuses to behave. **Likely Culprit:** Corrupt preference files are often at the root of file-sharing and networking problems. **Solution:** Drag the File Sharing folder and the Users & Groups Data File, both in the Preferences folder, to the Trash (don't bother emptying it yet—you can't). Restart, and the system creates a new Users & Groups Data File, replacing the corrupt data. (Of course, you must re-create previously defined users and groups.) In the Sharing Setup control panel, enter a new owner password, and turn file sharing on; the system creates a new File Sharing folder. Empty the Trash, deleting the problem file and folder.

PC EXCHANGE

Symptom: You've been mounting PC disks on your Mac for months; suddenly your Mac won't accept DOS disks. **Likely Culprit:** A damaged PC Exchange Preferences file. **Solution:** Trash this file and restart.

APPLE-MENU OPTIONS

Symptom: On start-up, a message says, "There is not enough memory to load all of your extensions," but you do have enough memory. **Likely Culprit:** A corrupted Apple Menu Options Prefs file. **Solution:** Trash this file and restart.

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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Not only can you use a PowerBook 190 or 5300 as an external hard drive on a desktop Mac, but you can also do the reverse, as Michael Adler of Waltham, Massachusetts, found. This tip works with the

PowerBook 190 and 5300 because the PowerBook's internal IDE hard drive doesn't have a SCSI ID, so there's no conflict with the SCSI ID of a desktop Mac's internal SCSI hard drive. This method won't work with desktop machines equipped with IDE drives, like the Quadra 630 series. Also please note that although Adler reports having no problems with this procedure, it is not Apple-authorized, so exercise caution.

Shut off the power on both computers. Use an HDI-30 to DB25 cable (not the type of cable you would use to connect a PowerBook to an ordinary external hard drive) to connect the PowerBook's SCSI port to the desktop Mac's. Adler uses the APS Ultimate PowerBook Connection Kit (\$49.95; 816/483-6100, sales@apltech.com) because it accommodates any kind of PowerBook SCSI connection.

Start up the desktop Mac, but leave the PowerBook off for now. To prevent data loss on the desktop Mac, caused when two computers try to access a hard drive at the same time, you must configure the desktop Mac so that it cannot access its internal SCSI drives but they still have power. How you do this depends on whether your Mac switches off its power automatically when you shut it down. If your Mac doesn't turn itself off, shut it down, but don't switch it off when you see the message "It is now safe to switch off your Macintosh." If your Mac does switch itself off, you must start it up with a floppy disk, RAM disk, or CD-

ROM; then make the hard drive inaccessible by dragging its icon to the Trash. Alternatively, you can start up with one of the emergency disks made by Norton Disk Doctor, quit the start-up application, and let the desktop Mac sit there displaying the dialog box that asks if you want to restart or shut down.

Finally, start up the PowerBook. The desktop machine's internal hard drive appears on the PowerBook's desktop just like an ordinary external SCSI hard drive.

Note that you can't run any PowerPC-native software on the desktop Mac



from a PowerBook 190 because the 190 lacks the PowerPC chip. Also, Apple's Installer balks if you try to install software that doesn't work on a PowerBook 190 or 5300 from the PowerBook onto the desktop Mac, such as System 7.5 (the 190 and 5300 require System 7.5.2). To get around this trap, hold down the option key while launching the Installer. You go directly to the Custom Install screen, where you can select the appropriate software—whether it runs on your PowerBook or not—for the desktop Mac.

Why Virtual Memory Reduces Memory Size

Q I read that enabling virtual memory (VM) on a Power Mac greatly reduces some native applications' memory requirements. Can you tell me why? Also, would Connectix's RAM Doubler provide the same memory-reduction benefits?

YOSHIHISA TAGAWA
Riverside, Connecticut

A Turning on VM or installing RAM Doubler changes how the Power Mac organizes its memory. With VM or RAM Doubler on, an application's PowerPC-native code does not go into the portion of memory allocated in the application's Get Info window (⌘-I), as does the application's 680X0 code, plus resources such as menu and dialog box definitions and data. Instead, that portion of code goes into another part of memory, alongside native code from other open applications. (An application's native Power Mac code does go into the Get Info application partition if VM or RAM Doubler is off.)

VM degrades system performance, but you can minimize the degradation by setting total memory just 1MB higher than built-in memory in the Virtual Memory section of the Memory control panel. For example, if your Power Mac has 16MB of built-in RAM, set total memory to 17MB. In this example, to use VM you would have to have at least 17MB of hard disk space available. RAM Doubler reduces native applications' RAM requirements exactly as VM does, but generally doesn't sap performance as much or require any hard disk space.

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QUICK TIPS

Mysterious System Errors

Q I use a Centris 610 at work and a Power Mac 6100 at home, and my coworker uses a Power Mac 7100. On each of these machines (although most frequently on the Power Mac 6100), we often get a "Floating point coprocessor not installed" system error. What does this mean? I'm not sure about the Centris, but I know the Power Macs have an FPU built in—don't they?

SARAH SMARRELLI

Manassas, Virginia

A Like most error messages, this one doesn't give you any useful, specific information. It certainly isn't literally true; as you observed, it can appear on a Power Mac even though every PowerPC processor contains an FPU. Technically, this message means the computer encountered a floating-point instruction it couldn't execute. Although an unexecutable floating-point instruction could indicate a missing FPU, in practice it simply means there's an unknown software problem.

You might wonder why the Mac so specifically diagnoses a floating-point problem. The answer lies in the codes used to store floating-point instructions

in memory. A Mac sees any instruction whose code begins with an *F* as a floating-point instruction. If the Mac gets a bogus instruction that begins with an *F* but isn't a valid floating-point instruction, the Mac simply sees a floating-point instruction it can't execute and bombs with the message you describe.

An error may have corrupted the part of memory containing the program the computer was executing, or may have caused the computer to lose track of where the program was stored. Either way, the computer gets what it expects to be an instruction but is actually gibberish. Imagine trying to make a chocolate cake after spilling batter all over the recipe or turning too many pages in the cookbook and ending up in the middle of a different recipe.

The software problem could be in the application named in the system-error alert box, but it's just as likely to be in the system software, a system extension, or a corrupted preference file. It's even possible that another application is contributing to the problem. You can try the usual approaches to tracking down software problems. If the system error always occurs in the same application, ask the publisher's technical support about

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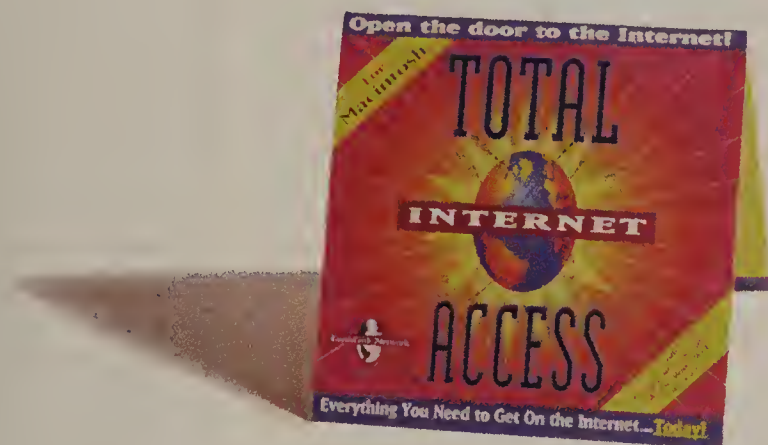
Marble Text

If you have Adobe Photoshop 3.0 and Adobe Gallery Effects Volume 1, you can quickly create marble text with the following method, discovered by Andrew Putschoegl of Oakdale, Minnesota.

1. Type the text in Outline style. Marble text works best with thin fonts at less than 60 points, like Desdemonda (shown in the example) or Palatino.
2. Use the magic wand to select the interior of the outlined text. To select multiple characters, shift-click inside each letter with the magic wand tool.
3. Select the color for your marble effect.
4. Choose GE Chalk & Charcoal from the Filter menu. (Usually this filter is in the submenu Gallery Effects: Classic Art 1.)
5. Deselect your text and voilà—you have quick and easy marble text.

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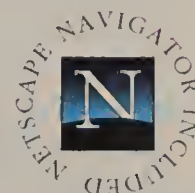
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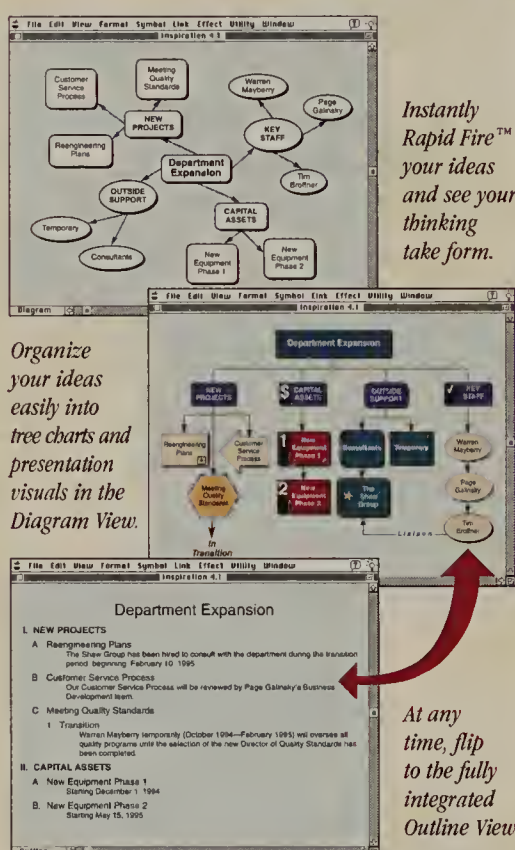


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QUICK TIPS

known conflicts with system extensions or other applications. Try moving preference files out of the Preferences folder so that the application will create new, undamaged ones. See if removing all but the most essential system extensions lessens the problem.

Use Casady & Greene's Conflict Catcher 3 (\$99.95; 408/484-9228, sales@casadyg.com) to verify start-up files and test them for compatibility. Reinstall application software in case the copy on your hard drive is corrupted. Do a clean install of the system software. Two remedies that won't cure this problem: installing software that emulates an FPU, and installing an FPU on a Mac that lacks one.

For more on translating the Mac's error messages, see the *Secrets* column, "Comedy of Errors," in April 1996.

Recovering Deleted Emailed Messages

TIP You may be able to recover mail recently deleted from Claris Emailed's In Box or Out Box even if the mail is no longer in Emailed's Delete Folder. Open the In Box or Out Box file, whichever you deleted mail from (located in the Emailed Files folder, which is in the same folder as the Emailed application file), with a program such as WordPerfect or BBEdit Lite that can open any file as a text document. There's a pretty good chance the last one or two messages are still there.

RAUL REGALADO
Toronto, Ontario, Canada

This tip points out a subtle security hole in Emailed. BBEdit Lite is free and available from Bare Bones Software (508/651-3561, bbsw@netcom.com) and from Macworld Online (<http://www.macworld.com>, or keyword Macworld on America Online). WordPerfect is at 613/728-8200.—L.P.

Dragging from Find File

After months of trying, Sam Charap of New York City finally figured out why he couldn't drag a batch of files from System 7.5's Find File window to a folder, a disk, or the Trash (as described in January's *Quick Tips*). He had removed the Finder Scripting Extension file from the Extensions folder. For the trick to work, both the Finder Scripting Ex-

New Stickies Colors

The System 7.5 utility Stickies has a Color menu from which you can choose one of six note colors. You can use ResEdit to add ⌘-key shortcuts to the menu (see "The Secret Life of Stickies," *Secrets*, March 1996), but what about changing the colors listed in the menu? Thankfully, you don't need ResEdit. Joseph Ashear's free utility program, Stickies Color Editor, lets you change the colors and the names listed in the Color menu. Download Stickies Color Editor from Macworld Online (<http://www.macworld.com>) or America Online (keyword Macworld).



tension file and the AppleScript file must be in the Extensions folder.

Stopping Restart or Shut Down

There are other ways to abort a restart or shut down besides activating a screen saver (as suggested in February's *Quick Tips*). Dana Nau of College Park, Maryland, simply launches an application by selecting it from the Apple menu. To avoid a long wait while the application launches, he selects something small, such as Key Caps.

More Window Arrangers

Rather than using an AppleScript script to move a window on screen (as described in April's *Quick Tips*), Gary Huvard of Chesterfield, Virginia, suggests using Allesandro Levi Montalcini's \$5 shareware DragAnyWindow. Not only can you use it to center a window on screen, but

DragAnyWindow also moves dialog boxes (such as Save and Open). Download DragAnyWindow from Macworld Online.

More Fax Machine Tricks

You can print to a fax machine through a fax modem even if you have only one phone line for both devices, as described in January's *Quick Tips*, but a simpler method works with some fax machines. Rob Fowler of Woodstock, Georgia, finds that all he has to do is connect a phone line from the fax modem to the fax machine, initiate a manual call through the fax software, manually set the fax machine to receive, and click the Mac button that indicates he has made a successful manual connection. If your fax machine requires you to pick up its handset before manually setting it to receive, hang up the handset after you click the button.

You can also use a fax machine as a low-resolution black-and-white scanner with a variation on the above method or the one outlined in January, notes Emanuele Fabris of Hudson, North Carolina. Connect the fax machine to the fax modem with a phone cord and follow these steps.

1. Put the paper you want to scan in the fax machine.

2. Follow your fax software's usual procedure to receive a fax manually on the computer.

3. Start fax transmission. Some fax machines require that you dial a phone number first—the number of the receiving fax station. In that case, just dial 1 and press the Start button.

If this method doesn't work, try connecting the fax machine to a phone outlet. When you hear the fax tones, unplug the fax machine's phone cord from the wall outlet and plug it into the fax modem. **m**

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He is the author of *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).



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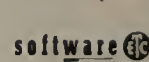
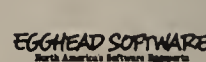
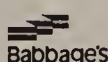
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Copyright Ain't Dead . . . Yet

by Suzanne Stefanac

When the framers of America's Constitution included protection for "works of authorship," they intended copyright to serve as a spur for free expres-

sion. The primary objective was not to feed the coffers of authors but "to promote the progress of Science and useful Arts." Accordingly, copyright law grants authors full rights to the original expression of their work, while still encouraging others to build upon the ideas and information in that work.

The intent of our copyright law has not changed in the course of 200 years, but the modes for disseminating information certainly have. Acknowledging this continuing evolution, the Copyright Act of 1976 tried to address the many shadings the law might acquire as it is applied to new media—the authors of the law guessing in an educated way about how those new media might evolve. Even so, burgeoning interactive and broadband Web publishing has stressed the law nearly to its limit.

Pundits may speculate on the death throes of copyright in the digital world, but potential publishers (and that includes even those who post to Usenet newsgroups) cannot afford to be cavalier. They should be aware that

the rightful owner of any protected work still has the right to seek damages in federal court. A judgment against you for violating a copyright can cost thousands to millions of dollars. Content isn't free quite yet.

Copyright Protections

Acquiring a copyright is easy. As soon as an original work is

forward at first, but digital media tosses a virtual monkey wrench into the mix. Not only are electronic copies of a work identical to the original, but the copies are ridiculously easy to make and transmit. In 1993, the Clinton Administration's Information Infrastructure Task Force, chaired by the secretary of commerce, began studying the problem.

Should exceptions for "fair use" be narrowed or maybe even eliminated? Should it be illegal to import, manufacture, or distribute devices that defeat copy-protection technology? Legislators, judges, and publishers alike are grappling with these questions daily.

Legally Speaking

In most cases, the owner of a copyright is the creator of the work or the person who commissioned it; it's also possible to purchase the copyright of a work created or commissioned by someone else. Even though a copyright notice is no longer required, it's still smart to include the word *Copyright* or the symbol © (option-G), along with the year and the name of the author or owner. This simple practice sometimes may enhance your ability to enforce the copyright should you decide to take an infringer to court.

Keep in mind that elements such as titles, names, short phrases, and slogans are not protected by copyright, although you can sometimes trademark them. Also, in keeping with the law's original intent, ideas are not protected by copyright. Neither are facts—scientific, historical, biographical, and so on. What is protected in any work that's subject to copyright is the author's particular expression of the idea or fact in words.

continues



"fixed" in a tangible medium of expression, it is considered to be copyrighted. You don't even need to include a copyright notice; since 1989, the protection has been automatic. Only the holder of a copyright can legally reproduce, modify, distribute, publicly perform, or display the work at will. No one else may.

This seems fairly straight-

The IITF quickly discovered that the questions are many and answers are elusive.

When is a digital work fixed? Does the electronic transmission of content constitute publication? When considering liability issues, should network and information service providers be treated as common carriers, distributors, or publishers?

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Copyright Exceptions

Sometimes the defense in copyright cases is based on fair use, which involves excerpting some portion of another's work within one's own. Use of excerpts by educators, critics, journalists, and researchers is generally recognized as proper, for instance. It is important to remember whenever invoking fair use that it is governed by a complex test (see "Guidelines on Fair Use"), and the outcome is decidedly difficult to predict.

Public domain works prove another bugaboo for publishers. Some materials—freeware, for instance—can be used or passed on without attribution or fee because the author voluntarily relinquishes the copyright. Another way materials enter the public domain is through the passage of time. Currently, protected

works enter the public domain 50 years after the death of the creator, 75 years after the first publication of a work-for-hire is commissioned, or 100 years after its creation, whichever is less. (Bills before Congress would extend the first two periods to 70 and 95 years, respectively; critics complain that this benefits only the current owners of the copyright and cheats the greater majority who would benefit from having the works in the public domain.)

Another way that a work enters into the public domain is when the copyright holder voluntarily relinquishes the copyright; shareware is a good example. It's also worth noting that government publications are public domain. Despite popular wisdom on the Net, newsgroup postings are *not* continues

Guidelines on Fair Use

The inclusion of copyrighted material in a secondary document can sometimes be justified by claiming "fair use." Traditionally, select uses in education, criticism, parody, news reporting, and research have constituted fair use, but the legal guidelines are as murky as litigation is expensive. Courts rule on a case-by-case basis. The primary criteria used in gauging fair use are

- **Nature of the work** You can copyright the expression of a fact or idea, but not the fact or idea itself. Consequently, you can copyright the words you use to explain how to defragment a hard disk, for instance, but not the procedure itself.
- **Amount** The claim that a relatively small portion of a copyrighted work was reproduced can serve as a defense. But if the court determines that the portion you used is "substantial" either because of its importance or because of its size relative to the whole, you lose.
- **Purpose** The courts are more lenient toward noncommercial use of copyrighted material than toward commercial ventures, but the fact that you passed a copyrighted article along for free does not necessarily protect you.
- **Value** If the potential market value of the copyrighted work suffers because of the reproduction, the courts will be more likely to rule for the original author.

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Shareware PICKS

Macworld Online's shareware bag is delightfully full. Here are a few of our current favorites.

Want to see more Apples on your horizon? **Apple Tetris** (\$8), by Bobby Kolling, substitutes falling apples for the game's usual tumbling blocks. Supports all the addictive features of the original.

Looking for more diversion? Christopher Jones's **Euchre 5.4** (\$20) provides a digital rendition of the familiar card-matching game. It's even smart enough to train your computer to emulate the other three players.

Having trouble taming all your Internet applications? Jonathan Dean's **CommFigure** (free) is a 32K dream that sweetly configures the settings for all your Net wares.

For those still beleaguered with dozens of floppy disks, **DiskTracker 1.0.2** (\$20) does a snappy job of cataloging even Aladdin Systems' StuffIt and Bill Goodman's Compact Pro archives. It includes fast searches and nifty labeling features as well.

Have you ever wanted to take a snapshot of a selected area of your monitor? Or even a shot that spans more than one monitor? Then John L. Hayes's **Snap 1.1.4** (\$5) is just the utility for you. The resulting black-and-white or color PICT file lands on the Clipboard and can even include pull-down menus and dialog boxes.

You can find these applications in the Macworld Online Software Library on America Online or on our Web site (<http://www.macworld.com>). They are in the "Mentioned in Macworld" section. Don't forget to pay your shareware fees.

necessarily in the public domain; legally you may copy and forward them only with permission from the author.

Remember that Internet access is available all over the world, meaning that what you post in Poughkeepsie will be published in Pakistan. Your work will be subject to the copyright laws prevailing wherever it is published, and those laws can differ dramatically from the United States'. Outside the United States, the Universal Copyright Convention and Berne Convention for the Protection of Literary and Artistic Works treaties protect authors' works. In most other countries, the copyright extends 50 years after first publication.

The bottom line when dealing with copyright issues

is mutual respect, but above all—caution. Treat others' works as you would have your own treated. Or live dangerously and chance telling it to the judge. **m**

Macworld Online editor SUZANNE STEFANAC (zorca@macworld.com) spends way too much time online. She invites suggestions on how she might regain a bit of a life.

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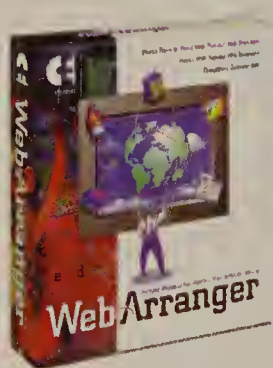
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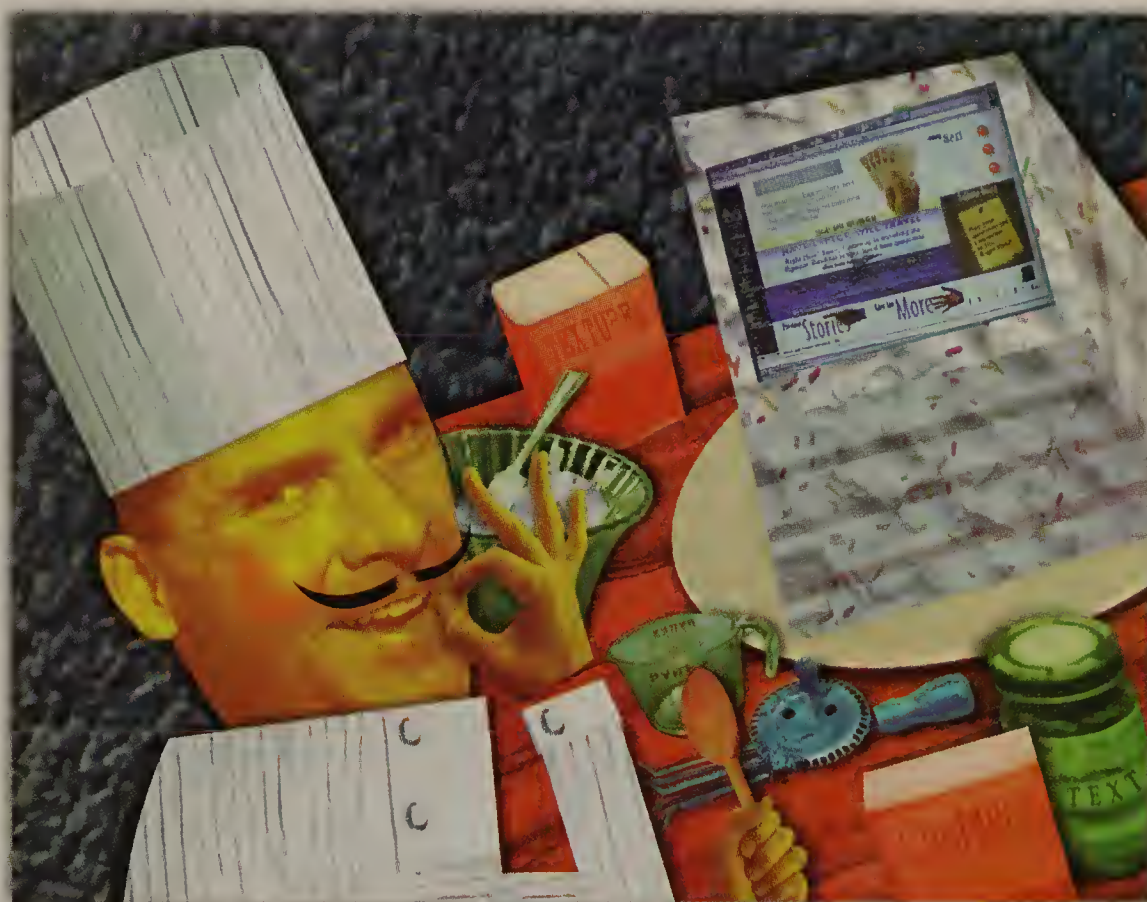
TECHNIQUES FOR CREATING INTERACTIVE SCREENS

by Jim Heid

Today's media producers generally have some roots in print design. And if you are one who's spent some time with Adobe PageMaker or QuarkXPress, chances are you were shocked the first time you created an interactive title or Web site: You mean I can't edit a screen's text once I've typed it? I can't control the line width of my Web site's text?

We human beans have been putting words and pictures on paper for centuries; putting them on a video tube is a newer endeavor. The tools for laying out CD-ROM or kiosk screens have been primitive until recently. And the World Wide Web is a lawless frontier where screens can look different depending on the browser software a visitor is using, and where you have little control over how text appears or even how line endings break. To a designer used to having control over every aspect of a document's appearance, the Web is an anarchic place.

This month, I look at some of the challenges of laying out screen graphics and offer some solutions. Much of what I discuss here also applies to Web-site image maps—graphics containing multiple hot spots that a visitor can click on to navigate the site. Next month, I'll focus on the Web-specific aspects of image maps. As always, you can find more details and links to relevant sites on my Web site, at <http://www.heidsite.com>.



How to Get the Layered Look

Screens and image maps often combine multiple elements—say, a colored or textured background plus graphics, text, and interactive buttons. The layer features in Adobe Photoshop 3.0 (\$895; 415/961-4400) are well suited to creating screens: you put the background color or texture in the Background layer, then create a new layer for each set of related elements (see “Building a Screen”). Placing elements in layers lets you reposition them without repainting the background and

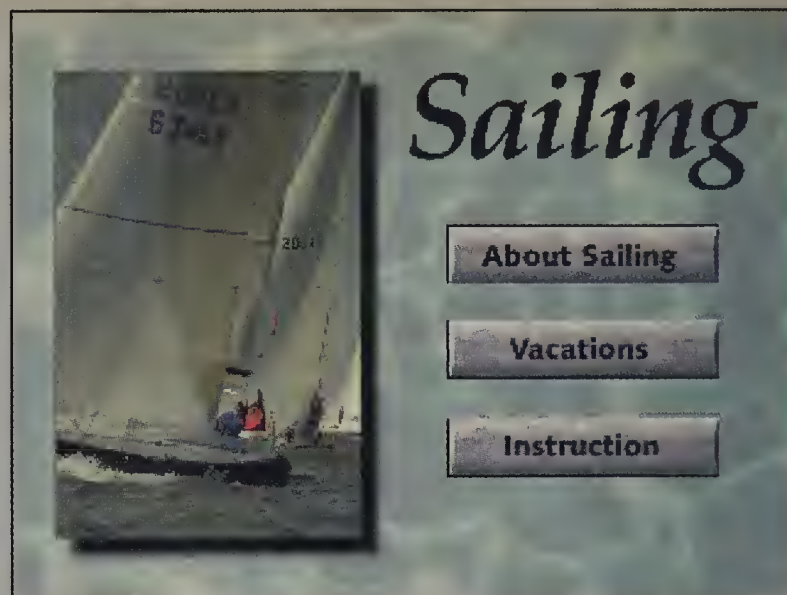
other elements—the classic bane of single-layer bitmapped graphics programs.

Another great screen-layout tool is Specular International's Collage 2.0.1 (\$149; 413/253-3100, info@specular.com). Collage doesn't provide Photoshop's wealth of image-manipulation tools, but it does let you instantly feather the edges of elements and create drop shadows, two common—indeed, often overused—design devices that can be cumbersome to create in Photoshop. I also find Col-

continues

BUILDING A SCREEN

It's easier to design complex screens if each element is in its own layer in Adobe Photoshop. But, unless you're using Director 5 from Macromedia (\$850; 415/252-2000), layers won't import directly into an authoring program. You must *flatten* (combine into a single-layer file) all the layers containing *static* elements, ones that always stay on the screen, and then copy the temporal elements—whose appearance depends on a user's actions—into separate files. Finally, to re-create the complete screen in an authoring program, you import the files and position them to match the Photoshop document.



In the screen above, the background (a full-screen, 640-by-480-pixel, graphic), heading text, and image are always visible, but buttons' appearances change as users click on them. Follow these steps to create the required files.

Save the full-screen image and its static elements

1. Save the final image to disk. (It's always a good idea to retain a copy of the original

version in its fully layered form.)

2. In Photoshop's Layers palette, hide each temporal element's layer by clicking on its eye icon.
3. Choose Save a Copy from the File menu.
4. In the Save dialog box, choose PICT File from the Format pop-up menu. Note that the Flatten Layers box becomes checked.
5. Click on Save or press return. You now have a PICT file containing the full screen and its static elements.

Save each temporal element in a separate file

1. In the Layers palette, activate the element's layer by clicking on its eye icon once.
2. Choose Select All from the Edit menu (⌘-A).
3. Choose Copy from the Edit menu (⌘-C).
4. Choose New from the File menu (⌘-N). Notice that the Image Size portion of the New dialog box reflects the element's proportions. Click on OK or press return.
5. Choose Paste from the Edit menu (⌘-V) to

large's layering features easier to work with than Photoshop's. (Alien Skin Software's Black Box 2.0 [\$119; 919/832-4124, alien-skin@alienskin.com] collection of Photoshop filters contains a drop-shadow filter that greatly simplifies the process; this filter is also included on Photoshop 3.0's CD-ROM, where you'll find it in Other Goodies: Third Party Products: Alien Skin Software.)

Dealing with Text

Neither Photoshop nor Collage is very good at creating and manipulating text. You can create antialiased (soft-edged) text, but you can't work with text as you might in a page-layout or illustration program—you can't specify paragraph indents or kern (tighten) certain character pairs manually, for example. Worst of all, these programs turn text into a

graphic—a picture of text—the moment you create it; you can't edit it later. To fix a typo or change a line, you must retype the affected text from scratch. Two alternatives to this nightmare exist.

The Illustrator Alternative One choice is to use Adobe Illustrator to create and edit text, then open the resulting encapsulated PostScript (EPS) file in Photo-

Tips for On-Screen Text

A computer screen's low resolution presents special challenges for displaying text. Here are some tips and issues to consider.

Don't get text-heavy Paper is the best medium for tomes. For large passages of text, give a brief summary and a button, perhaps labeled Show Details, that opens a scrolling text box containing the gory details. Or consider providing a feature that

lets users print lengthy passages.

Don't get small Avoid using type in sizes any smaller than 12-point—14-point is a good size for readable on-screen body text.

Watch your line length For print and on-screen text, strive for an average of 8 to 12 words per line. Too few or too many words per line makes for difficult reading. Web developers have little control over this, since a surfer can change line breaks by resizing the browser window. But you can avoid creating wide graphics that

would make visitors create an overly wide browser window.

Use antialiased text when possible

Text with smoother edges looks better and is easier to read—if it's not too small. But antialiased text—essentially a graphic—isn't searchable. (Macromedia Director 5 provides searchable antialiased text.) Conventional, aliased text is searchable, but for a CD-ROM title, you may need to license and distribute a screen font and require users to install it—or you can gamble and restrict yourself to fonts likely to be installed, such as Helvetica or Times. The font-distribution wrinkle doesn't apply to the Web, where surfers can specify

the font in which text appears—yanking yet another aspect of a screen's look out of your hands.

Provide adequate contrast between type and background

People are used to seeing dark text against a plain, light background. Give them what they are used to. Dark brown text on a dark gray background, for example, is a no-no. Don't use reversed text (light type on a dark background) for lengthy passages. Also avoid using very bright background colors—they impair legibility and look amateurish. And in Web sites, avoid extremely busy background graphics on pages containing large passages of small text.



paste the element into the new document.

6. Save the document as a PICT file.

7. Repeat these steps for each temporal element in the screen.

After you've created separate files for the screen and its various elements, process them—reduce bit depths, optimize color palettes, and so on—using Photoshop or Equilibrium's DeBabelizer ToolBox (\$399; 415/332-4343), info@equil.com).

shop. Photoshop antialiases the text, retaining the color you specified in Illustrator, and places the text in its own layer.

This approach enables you to exploit Illustrator's type-handling talents, but it introduces its own hassle. If a text revision rears its ugly head, you must return to the Illustrator file, make the change, reopen the EPS file in Photoshop, and then replace the old text with the new.

The ScreenReady Alternative Adobe's ScreenReady utility (\$199; included on the \$595 Illustrator 6.0 CD-ROM) lets you avoid this aggravating process. With ScreenReady, you use Illustrator or a page-layout program to create not just screen text, but also the screens themselves.

ScreenReady works like a printer driver: after installing it, you select ScreenReady in the Chooser. To create a screen, select the Print command, and ScreenReady creates a PICT file, complete with antialiased text and graphics, if you so choose. The beauty of this approach is that it lets designers create screens using familiar tools: PageMaker, Illustrator, Macromedia FreeHand, and QuarkXPress. Just as significant, ScreenReady lets you apply those programs' type-handling and page-layout features. For example, you can place backgrounds

OF BUTTONS AND BACKGROUNDS

Attractive, tastefully designed navigation buttons and screen backgrounds add polish to a project.

INTERFACE ISSUES

For CD-ROMs and kiosks, an important part of interface design involves giving users feedback about various button states: when the pointer is over a button, when a user has clicked on it, when it's disabled.

In Mac dialog boxes, for example, a button's colors invert when you click on it. Developers often create fancier effects, such as the illusion of physically pressing the button, by displaying different button images in different situations. How hard it is to achieve such effects depends on your authoring program. In Macromedia Director, you must write Lingo code. Macromedia's Authorware 3.1 (\$4995) is easier, providing a dialog box where you specify button states. You import artwork for each version and specify when each should appear. At left, the top screen shows an untouched button (Up state); the inverted version, below, appears when a user clicks on the button (Down state).



MAKING YOUR OWN

You can create 3-D buttons and backgrounds using several programs, including Adobe TextureMaker (\$199), Specular International's TextureScape 2.0 (\$199), and Alien Skin Software's Black Box 2.0 (\$119).



USING CANNED BUTTONS

Several companies sell collections of ready-to-use buttons, backgrounds, and other interface elements; many even include Director Lingo code, making it easy to incorporate these elements into a project. Examples include Jawai Interactive's Screen Caffeine Pro (\$149; 512/469-0502, sales@jawai.com), stat media's Instant Buttons & Controls 2.0 (\$180; 714/280-0038, gbirch@statmedia.com), and Vicious Fishes Software's Multimedia Tackle Box (\$49.95; 714/671-0330, viciousfish@aol.com). And the Web abounds with sites containing free buttons and backgrounds; I've posted links to many of them on my site.



and repeating elements on master pages, or number a screen using your page-layout program's page-numbering features.

ScreenReady has some rough edges: it sometimes creates color palettes properly, and its antialiasing features can introduce undesirable blurring in photos (see *Reviews*, *Macworld*, December 1995). I work around these problems—and save hours of production time—by preparing the text portions of screens in ScreenReady using Photoshop to place photographs and create color palettes.

Screen Test

As you create screens, apply the graphics-optimization techniques I discussed last

month: use low bit depths; optimize palettes; and for Web graphics, choose the file format that provides the best balance of image quality and file size.

There is no single perfect screen-layout tool, but by creatively combining Photoshop, an illustration or page-layout program, and Adobe ScreenReady, you can put your efforts on screen in far less time than it took not long ago. **m**

Next month: Making Web image maps

Contributing editor JIM HEID produced the interactive CD-ROM that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

Compositing and Edge Spill

by David Blatner

Visible halos are all very well for spiritual figures and aura readers, but when you're trying to composite bitmapped images in a program like Adobe Photoshop, a halo is the last thing you want to see. Nonetheless, halos are the most common visual problem when you're pasting one image onto another.

Halos are the result of *edge spill*, which is inevitable in a scanned image. Edge spill happens for various reasons, including the blurriness of the scan, the natural diffraction of

light, and the process of turning a continuous-tone image into a grid of pixels.

For instance, let's say you are working with a picture of a man in front of a field of bright-green cornstalks. You cut the guy out and paste him in front of a beach-at-sunset image. The problem is that the green background "spills" into the edge of the man, and it appears as a halo around him in the sunset picture. Disaster!

Inside the Edge

One way to combat edge spill is to make your selection slightly inside the object, snipping off the edge where the background color touches it

(see "Trim Out Edge Spill"). This often works for images that have defined, hard edges. You only need to make your selection a pixel or two in from the edge, and you'll leave the spill behind. This technique is a must if you're creating clip-

ping paths (for more on clipping paths, see the April *Publishing Workshop*).

Quick Masks

One of the best ways to see if you'll have an edge-spill problem when making a selection

Trim Out Edge Spill

With images that have hard edges, it's important to trim out as much of the edge spill as you can to avoid halos. The clipping path is only two or three pixels farther in from the edge in the figure on the bottom than in the one on the top.

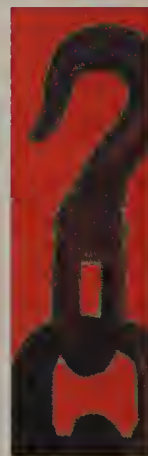


Using Quick Masks

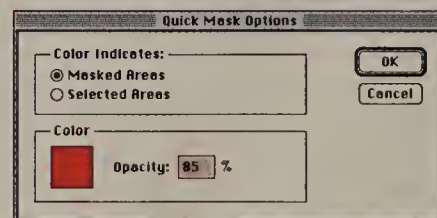
The Quick Mask mode in Photoshop gives you another view of the selection, showing exactly what is and isn't selected, so you can determine whether you have edge spill. You can color a mask however you like; it's just a preview.



The original image with a selection.



After switching to Quick Mask mode and zooming in, you can see the selection better. The halo around the image indicates an edge-spill problem.



Double-clicking on the Quick Mask icon in the Tool palette brings up the Quick Mask Options dialog box, where you can set the color. For best edge-

spill detection, set Opacity to about 85 percent. Choose a color that's similar to the background color on which you're going to paste this object.

LEVELS OF QUICK MASK

in Photoshop is to switch to the Quick Mask mode (press Q). Quick Mask shows you precisely what is and isn't selected. Then, if you do discover an edge spill, you can often take care of it right there. For example, when you're selecting an object that was photographed on a white background, the edge spill has no color (it's just a bright halo, not a colored one) and you can get rid of it easily (see "Levels of Quick Mask").

Soft-Edged Spill

If you're trying to get rid of edge spill in an image that has soft or finely detailed edges, you're in for a lot of work. For example, cutting out a model whose hair is blowing in the wind and pasting the image against a different background is very difficult. The fine hair just has too much edge spill. There are ways to do it in Photoshop, but if I had to do this sort of thing often, I would take a serious look at using Live Picture (Live Picture, 408/464-4200) or Ultimate's PhotoFusion plug-in (818/993-8007).

More than One Way

There are dozens of advanced methods for getting rid of edge spill in Photoshop. You can convert the selection into a border (choose Border from the Modify submenu in the Selection menu), then use the rubber-stamp tool to copy material from the foreground or background image into this border. Or you can use snapshots or magic erasers. The important thing is to do *something*. Edge-spill halos are a surefire giveaway of a faked image. **m**

DAVID BLATNER is a Seattle-based graphic arts consultant. He is the coauthor of *The QuarkXPress Book* and *Real World Photoshop*, both from Peachpit Press. You can E-mail him at david@moo.com.

In Photoshop, when preparing to cut or copy a foreground image that is sure to have edge-spill problems, I often fine-tune my selection in Quick Mask mode, using Gaussian Blur and the Levels dialog box.

1. Make your selection using the selection tools as usual.



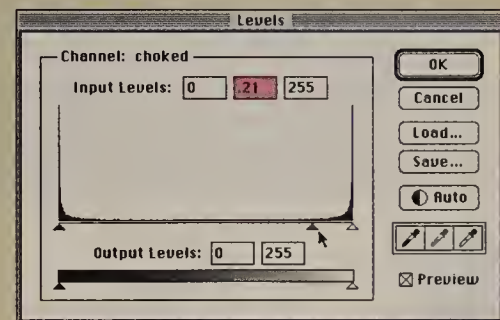
2. Switch to Quick Mask mode (press Q). Here, you can clean up your selection and see if there are edge-spill problems (see "Using Quick Masks"). In the first image below, the mask reveals an edge-spill halo; in the second image you see how the final composite would look if you did nothing about the halo.



3. Apply a small-radius Gaussian Blur to the mask (the radius should be no more than 2 pixels). This temporarily worsens the edge spill.



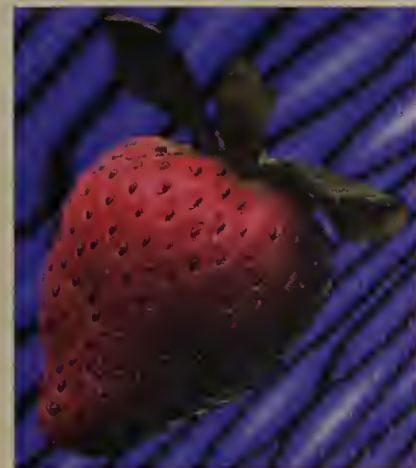
4. Change Quick Mask's Levels gamma setting (the middle input setting in the Levels dialog box—⌘-L) to darken the edge pixels. You may have to change it significantly.



5. The dark halo here tells you that the selection has shrunk to eliminate the edge pixels—there will be no edge spill.



6. The final image with its new background.







Just REWARDS.

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If you can *dream* it, you can *do* it.



Image credits: (clockwise from top left) Gerald Bybee, Robert Bowen, Martina Lopez, Eric Dinyer, Giles Hancock, M.A.D. *The Adobe Graphic Sampler CD is \$9.95 plus appropriate sales tax. Adobe, the Adobe logo and Adobe Photoshop are trademarks of Adobe Systems Incorporated or its subsidiaries which may be registered in certain jurisdictions. All other marks and trademarks are the property of their respective companies. ©1995 Adobe Systems Incorporated. All rights reserved.

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Graphics Workshop

Manipulating Colors to Give Images Depth

by Cathy Abes

ARTIST Tucson, Arizona-based artist and photo-illustrator Judy L. Miller has produced work for such publications as *How* magazine, *Texas Monthly*, and *Tucson Lifestyles*. Examples of her work can be

found on the Digital Masters CD-ROM included with Adobe Photoshop 3.0.

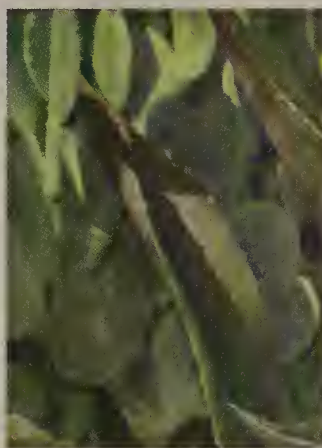
HOW IT WAS DONE In creating this photo-illustration of an agave plant against a background of cactus, Miller used a variety of subtle color blends and manipulations in Photoshop and selectively applied several Photoshop and Adobe Gallery Effects filters to make some areas of the image stand out and other areas recede. Miller uses Trumatch colors because she finds them the most accurate for reproduction.

The image originated from the artist's black-and-white photograph, which she hand-colored, scanned, and cropped.

To make the foreground sections distinct from the background and enhance the appearance of depth and dimension, Miller heightened the contrast and enhanced detail in the foreground sections, darkened their edges, and applied subtle color blends to make the colors warmer.

Similarly, she made the background areas less prominent by applying cool-toned color blends and filters that softened textures and other details.

THE TOOLS **Hardware:** Power Macintosh 8500/120 with 80MB of RAM and 1GB and 2.4GB internal hard drives; Hewlett-Packard 1.3GB magneto-optical drive; Iomega Zip drive; 44MB SyQuest drive; Hewlett-Packard ScanJet IICx flatbed scanner. **Software:** Adobe Photoshop 3.0.5; Adobe Gallery Effects Filters Volumes I and II. **m**

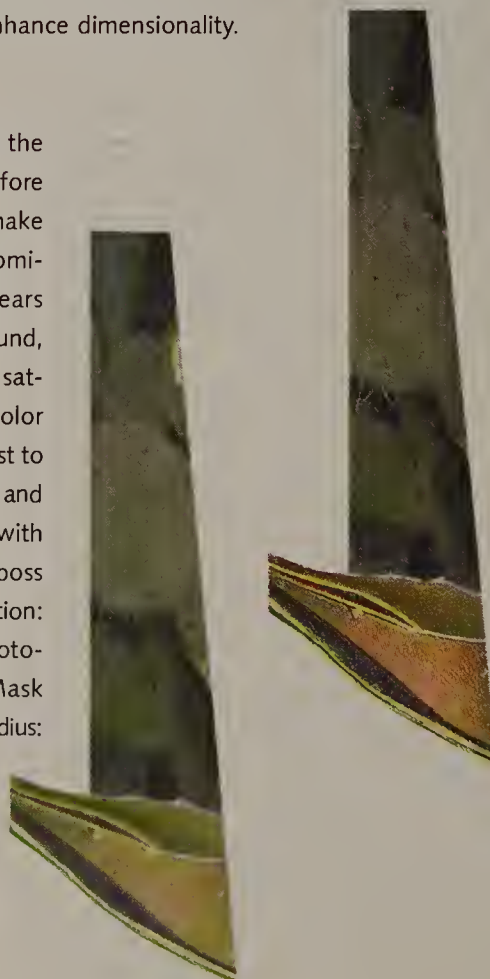


1 The original cropped scan, taken from the artist's black-and-white photo, which was printed on fiber-based paper mounted on a board and modified with oil paint and colored pencil to add color and texture and to enhance dimensionality.

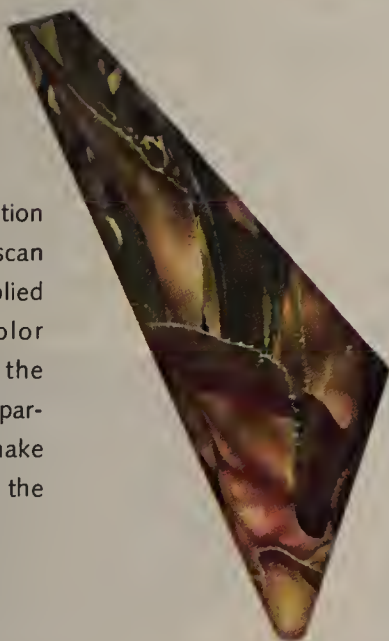


2 After saving an alpha channel for an area she wanted to recede, Miller applied a blend to the selection in Color mode, at 25 percent opacity, going from a kelly green at the top to a yellow-green at the bottom. With the alpha channel loaded, she softened background detail using the Gallery Effects filter Angled Stroke (Directional Balance: 50; Length: 25; Sharpness: 5).

3 A detail from the original scan, before manipulation. To make this area more prominent so that it appears to be in the foreground, Miller adjusted the saturation, curves, color balance, and contrast to warm up the colors, and sharpened the leaf with Gallery Effects' Emboss filter (Relief: 5; Position: top right) and Photoshop's Unsharp Mask (Amount: 150%; Radius: 1; Threshold: 15).

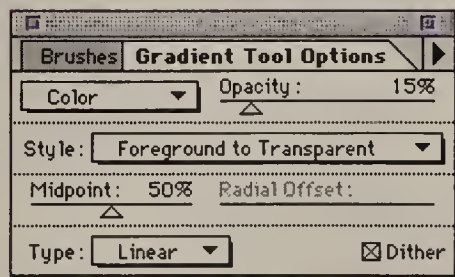


4 To further separate the leaf from the background, Miller darkened the right and top edges with a 25 percent blend in Multiply mode using Photoshop 3.0's new Foreground to Transparent option, which blends from the foreground color (here, a dark teal) to nothing; blending to nothing rather than to another color yields a subtler color change and avoids the chance of complementary colors' neutralizing each other toward gray where they overlap.

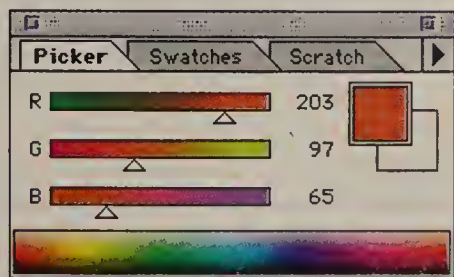


5 The center section of the original scan before Miller applied four separate color blends—all with the Foreground to Transparent setting—to make the leaf appear in the foreground.

6 Miller used a 15 percent orange (Tru-match 6c2) blend from bottom to top in Color mode (settings shown here); a 10 percent yellow (13b2) blend from top to bottom in Multiply mode; a 10 percent blend of the kelly green from the right edge in




Multiply; and a 16 percent blend of pink (47c1) from the lower-right corner at a 45-degree angle in Multiply. She also adjusted Color Balance and filled the entire shape with a 10 percent pale yellow (12c1) in Color mode.



8 Using Multiply mode, she filled the channel with a deep violet (Tru-Match 39a5) at 50 percent. Deselecting Channel 4 copy and loading Channel 4 to act as a guide, she selectively darkened edges using black, with the airbrush in Multiply mode at 10 percent opacity.



7 Miller created an alpha channel (Channel 4) and made a copy of it, to which she applied the Minimum filter at 10 pixels to shrink the selected area, and a 20-pixel Gaussian Blur to soften its edges. After inverting Channel 4 copy to black, she loaded Channel 4 into Channel 4 copy and inverted the selection, filled the background with black, and loaded the copy into the RGB image. This produced a narrow feathered mask inside the alpha channel for subtly darkening the edges of the shape.



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close to perfect
or perfect,
which would
you choose?

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Adobe PostScript

Buyers' Tools

Gigabyte Hard Drives

GIVE YOUR RAPIDLY GROWING COLLECTION OF FILES SOME ELBOWROOM

by Howard Baldwin

Remember the "Twilight Zone" episode where Mickey Rooney wishes he were big, and moments later, he's bumping his head on the ceiling? That's probably what's happening to the data in your hard drive right about now. One minute there's plenty of room, and the next, all your work files and the stuff you've downloaded from the Internet are suddenly crowding each other. If you bought one of the first Power Macs two years ago, you've probably already stuffed your 250MB hard drive chock-full.

To help you boost your Mac's capacity, Macworld Lab tested 17 external hard drives holding 1GB to 2.5GB to see which ones give the best performance with the best features for the best price. At a time when most new Macs come with 500MB to 1GB drives, the recommended capacity of an additional drive has changed dramatically from just a few years ago, when good additional capacity meant 200MB to 500MB.

It's easy to assume that one drive is pretty much the same as another, but that's not true. When we tested drives' ability to search databases, open and save Adobe Photoshop files, and copy files, we found startling differences, even between drives of the same capacity from the same distributor and using the same manufacturer's mechanism (see the benchmark, "Drive Time Performers").

For good measure, we also tested one of the new hard drive bundles that require you to install a PCI SCSI-accelerator card with the drive (result: fast but

expensive). And we tested three internal drives to see if these are a better bet than the more expensive, space-taking external models, since most desktop Macs now come with an extra internal drive bay and use a faster SCSI bus inside the Mac than they do outside.

The Feature Players

You may ask yourself what could be so complicated about buying a box that sits next to your Mac. While there may be a dozen hard-drive vendors, only a handful of companies make the drive mechanisms themselves—Conner, Fujitsu, IBM, Micropolis, Quantum, and Seagate—and that number is shrinking: Quantum has decided to close its assembly plants this year and rely on Japanese drives; Microp-

olis has sold its disk-drive assets to Singapore Technologies; and Seagate has swallowed up competitor Conner. Two names don't show up on this mechanism list: Hewlett-Packard and Toshiba. MicroNet Technology will begin using HP mechanisms in its drives this summer, while Toshiba (and IBM) mechanisms are usually sold as internal drives.

Still, there were speed differences. While one Conner-based drive took just 5 minutes for a database search, a Micropolis-based drive took more than 6 minutes. The mechanisms that were swiftest at opening and saving a Photoshop file were almost twice as fast as the slowest—57 seconds versus 101 seconds to open the file, and 41 seconds versus 87 seconds to save the file. If you think your



ROBERT PERRY

time is worth \$100 per hour, saving 40 seconds of processing comes out to a savings of a little over \$1. That adds up when you consider how many Photoshop files you work on in the course of a day.

Other differences between the drives include the formatting software that comes with them—usually CharisMac's Anubis, FWB's Hard Disk ToolKit, or Ontrack Computer Systems' Disk Manager (all three are similar in features and performance). Other companies customize their own utilities. APS Technologies enhances CharisMac's Anubis code to create its APS PowerTools utility, and MicroNet writes its own utility.

Certainly, most of the drives are Mac-beige boxes, but they differ in touches. You can stand some drives vertically to save space (bravo, Liberty Systems and Optima Technology). Others make it easy to change the SCSI identification number—just press a button with your finger (thanks go to APS, MicroNet, and Optima), as opposed to finding a sharp instrument to depress the button, which the other drives force you to do. Finally, some drive makers such as Microtech and MacProducts USA offer double power sockets so you can give the drive its own power supply.

Warranties range from one to five

years; MicroNet and Optima offer optional extensions. Three years is an optimal warranty, since the typical Macintosh user upgrades in that time.

You'll notice one popular drive seller missing from this comparison: La Cie (503/520-9000). The company was updating its products during our testing and so declined to participate.

The Last Word

It would be so easy to report that drives from one distributor or with one particular mechanism are a sure buy. But no can do. FWB's Hammer PE drive using the Conner mechanism excels, but its Pock-

What 1.0GB to 2.5GB Drives Offer

Company	Product	Star Rating ^A	List Price/ Street Price ^B	Phone	Mechanism	Capacity	Assessment
APS Technologies	APS MS 2.0	★★★/6.0	\$800/\$800	816/483-1600	Micropolis 4221	2.1GB	Its excellent manual and nice selection of bundled software are complemented by good performance.
	Q1080	★★★/5.9	\$350/\$350	816/483-1600	Quantum Fireball 1080S	1.1GB	Fastest in opening a Photoshop file, the Q1080 was a slightly above middle-of-the-road performer otherwise.
Direct Connections	DCM 1200	★★★/5.5	\$322/\$322	612/937-6283	Fujitsu M1606S	1.2GB	The DCM 1200 performed decently in most speed tests, and it gets points for a low price and five-year warranty.
	DCM 2400	★★/3.6	\$685/\$685	612/937-6283	Fujitsu M2915S	2.4GB	In most performance tests, the DCM 2400 came in dead last. And why would you want the SCSI ID on the bottom of the drive?
FWB	Editors' Choice Hammer PE 2000	★★★/6.7	\$1079/NP	415/325-4392	Conner CFP 2105S	2.1GB	Consistently among the top five drives in tests, the Hammer PE 2000 is hampered by high cost and a two-year warranty.
	PocketHammer 2050	★★★/5.1	\$1479/NP	415/325-4392	Seagate ST32550N	2.1GB	So-so test scores, coupled with a hard-to-find and hard-to-adjust SCSI ID control, keep this drive's score low.
Liberty Systems	50 1GQ Series	★★★/5.1	\$699/\$699	408/983-1127	Quantum Fireball 1080S	1.1GB	Only its compact size and speed recommend it; otherwise the drive is expensive, with only a one-year warranty.
	50 2.1GQ Series	★★★/5.4	\$1099/\$1099	408/983-1127	Conner CFP 2105S	2.1GB	Relentlessly good in its test scores and price, but it is downright skimpy on installation instructions.
MacProducts USA	Magic Seagate Barracuda	★★★/5.2	\$1006/\$936	512/892-4070	Seagate ST32550N	2.1GB	It's not noticeably faster than the other MacProducts drive, and it has the same case, software, and warranty. So why does it cost more?
	Magic Seagate Hawk	★★★/5.6	\$858/\$790	512/892-4070	Seagate ST32430N	2.1GB	One of two drives that has a pass-through power connector, so you can power another device from the drive. Nice warranty, too.
MicroNet Technology	Advantage 2000	★★★/6.0	\$1080/\$999	714/453-6100	Conner CFP 2105S	2.1GB	A top performer in our speed tests, it also boasts a clear user's guide; unfortunately, you have to pay for more than a year's warranty.
	SSW-1800	★★/4.5	\$2185/\$1999	714/453-6100	Seagate ST12450W	2.1GB	Consistently at the bottom of our performance tests, this drive screams only when you add Micronet's \$400 Power Raven PCI card.
Micropolis	Taurus AV4221	★★★/6.5	\$1270/\$875	818/709-3300	Micropolis 4221AV	2.0GB	A strong performer in several tests, the AV4221 boasts a great five-year warranty and a stunning design.
Microtech	Blue Storm 2000	★★★/6.4	\$2882/\$1850	203/468-6223	Conner CFP 2107S	2.4GB	Strengths include a strong performance, a unique LCD readout, stackability, and a 5-year warranty. However, the price is a bit high.
Optima Technology	MiniPak 2100	★★★/5.3	\$975/\$845	714/476-0515	Quantum VP32210S	2.1GB	A consistently poor-to-average performer, the Optima MiniPak 2100 nonetheless is nicely priced.
ProDirect	Editors' Choice PDC 2400	★★★★/7.0	\$800/\$750	612/941-1805	Conner CFP 2107S	2.4GB	A winner all the way around in terms of speed, value, and design.
	PDI 1200	★★★/6.2	\$335/\$325	612/941-1805	I8M DeskStar DPES-31080	1.2GB	While it has the same excellent design and features as the higher-capacity PDC 2400, the PDI 1200 runs only at average speeds.

NP = Not provided. ^A Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for explanation.) ^B Actual prices could be higher or lower than the estimated street price provided by the company.

Drive Time Performers

Best result in test. Mechanisms are listed from fastest to slowest. All mechanisms tested with external SCSI port unless noted.

While performance is generally similar from drive mechanism to drive mechanism, some do better in certain tasks than others, as Macworld Lab tests show. More important is what Mac you use the drive with: notice how all mechanisms were slower in tests with the 4th Dimension database on a Power Mac 7500/100 than on a Power Mac 7100/80. That's because the

7500 does not come with a cache card (it's an option) while the 7100 does. With an optional cache installed on the 7500, the drives' performance was about 30 percent faster than on the 7100. Searches with 4D are likewise slow with the Power Raven SCSI accelerator card, since it is optimized for large file transfers, not the small transfers used in databases.

TIMES ARE IN SECONDS. SHORTER BARS ARE BETTER.

Drive Performance Varies Widely

On a Power Mac 7100/80

	Overall Performance Ranking*	4D Search	Open Photoshop File	Save Photoshop File	Copy to Drive	Copy from Drive	Duplicate 40MB File
Conner CFP 2107S	1.00	300	60	41	29	40	30
Micropolis 4421 (internal)	0.99	357	57	53	27	36	26
Quantum Fireball 1080S	0.95	349	57	50	29	38	31
Conner CFP 2105S	0.95	313	66	47	29	39	30
Micropolis 4221AV	0.94	371	58	61	29	37	29
Fujitsu M1606S	0.93	376	70	56	23	38	31
IBM DeskStar DPES-31080	0.93	313	66	54	30	39	31
Seagate ST32430N (internal)	0.92	340	65	46	31	41	34
Micropolis 4221	0.92	382	68	55	29	36	29
Seagate ST32430N	0.92	340	65	46	31	41	33
Seagate ST32550N	0.88	334	66	64	28	41	33
Quantum VP32210S	0.86	329	80	50	35	40	34
Quantum Fireball 1280S (internal)	0.82	347	69	67	33	43	39
Seagate ST12450W	0.82	345	71	63	34	42	38
Fujitsu M2915S	0.66	337	101	87	60	43	56

On a Power Mac 7500/100

Micropolis 4421 (internal)	1.00	515	59	53	20	20	20
Quantum Fireball 1280S (internal)	0.93	496	58	64	22	21	24
Micropolis 4421	0.92	516	65	50	23	22	25
Seagate ST32430N	0.85	497	73	51	26	25	31
Seagate ST32430N (internal)	0.85	496	78	56	27	19	32
Quantum Fireball 1280S	0.75	488	77	80	28	27	36

A Card Makes a Real Difference

Using a Seagate ST12450W

on 7500/100 w/Power Raven PCI card	1.00	504	47	53	17	16	15
on 7500/100	0.70	479	73	66	26	25	30
on 7100/80	0.67	345	71	63	34	42	38

* This ranks overall performance compared to the fastest mechanism (which has a ranking of 1.00).

BEHIND OUR TESTS

Macworld Lab tested high-performance hard drives using our standard suite of business and graphics applications. To show the effect of fast access, we ran an unindexed search of a 96,775-record ACI US 4th Dimension database. For an indication of data

throughput, we opened and saved a 40MB file in Adobe Photoshop. To determine general performance, we duplicated a 40MB file in the Finder, as well as copied the file to and from our internal drive. —Macworld Lab testing supervised by Danny Lee

etHammer 2050 using the Seagate mechanism doesn't. Liberty Systems uses both Conner's 2.1GB and Quantum's 1.1GB mechanisms, but the results for both were relentlessly average. The MacProducts drives, using Seagate mechanisms, also deliver middle-of-the-road scores, as did Optima using a Quantum mechanism. (Note that MacProducts also sells under the names Bottom Line Distribution and DGR Technologies.)

The typical problem that you face when buying a drive is that drive manufacturers frequently mix and match mechanisms; that's why you see 2GB drives from the same manufacturer at prices that differ by hundreds of dollars.

The answer is to be discriminating. If you're looking for speed, stackability, or other features, expect to pay a premium (perhaps as much as \$1 per megabyte). And if you really want to roar, check out drives with bundled PCI cards. But if you're looking for a straightforward storage solution, don't pay more than 33 to 50 cents per megabyte, and ask to know what mechanism the drive uses. Whatever drive you get, get the largest capacity you can afford. After all, what seems like a lot of storage today won't seem like that much tomorrow. **m**

Senior editor HOWARD BALDWIN covers storage for Macworld.

1GB TO 2.5GB HARD DRIVES



To choose the best drives, we looked at speed in real-world operations and then factored in price per megabyte and ease of use.

★★★/6.7 **Hammer PE 2000** This 2.1GB drive delivered excellent scores across tests, unlike most drives. This outweighs its high cost and short warranty. **Company:** FWB. **List price:** \$1079.

★★★★/7.0 **PDC 2400** Like an eye-catching sports car, this 2.4GB drive looks good and goes fast—but it's also offered at a great price. **Company:** ProDirect. **List price:** \$800.



16.7 million



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Adobe PostScript

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Register early and you'll not only ensure your spot at this can't-miss event, you'll also save on conference and exhibit fees. Return the attached registration form with your payment by July 8th and save \$25 on all conference sessions and exhibits (\$150 now vs. \$175 at the door). An Exhibits-only admission saves you \$15 (\$25 now vs. \$40 cash only at the door). All early registrants, except international, receive their admission badge in advance. So rather than spending your time registering on-site, you'll be spending your time with the Macintosh experts!

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as though the speaker was
sharing with us. Excellent,
excellent, excellent!"***

THE FUTURE-FOCUSED CONFERENCE PROGRAM

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A. The Macworld Magazine Conference.

Macworld's editors, columnists, and featured guests present living pages of the magazine's hottest topics.

- What's Hot at the Expo • Best of Macworld MacSECRETS • Become Your Own Troubleshooting Guru • Macworld Art Bootcamp.

B. The Design/Art/Prepress Conference.

Celebrated artists, illustrators, designers, and graphics gurus share intensely useful tips, tricks, and technology breakthroughs.

- Designing Graphics for the World Wide Web • Creative Imaging • Kai's Killer Tips and Tools • Desktop Color Scanning • Prepress Forum: Tested Tips, Solid Shortcuts • Creative Layout Techniques • Digital Photography • Illustrator WOW! • Painter WOW! • Photoshop WOW!

C. The Internet Conference.

Get a leg up on the Internet (and your competition) with sessions designed to help you cruise, serve, and populate the 'net. Give your business the Macintosh/Internet advantage!

- How to Set Up Your Web Server • Browsers and Additions • Tips and Tricks for Web Graphics • Web Databases • Intranet Insights • Internet Security • CD-ROM vs. Internet Publishing • Building Interactivity into Your Web Site • Cool Web Server Tools! • QT 3D Rave • Server Administration • Commerce on the Web • Non-Web Internet Technologies.

D. The Operating System/Connectivity Conference.

Learn how to maximize the Mac with the bonuses that Apple threw in for free — to upgrade your Mac so that it will continue to perform at peak, and connect to even more powerful networks.

- Upgrading Your Network to Support Digital Media; FastNet, ATM, & More • Fast Outside Connections: ISDN and Beyond • Dealing with OpenDoc and Cyberdog • Apple Extensions Explained • Getting More Years Out of Your Mac • Getting Your Mac to Talk to You • Tuning Tips for Your Mac • 7.5.3, Copland, and Beyond.

E. The Creating Entertainment Conference.

For design, video, film, and multimedia professionals, the increasing power of the Mac, coupled with the global reach of the Web, offer unparalleled opportunities for entertainment creation. Learn from the pro's and have fun while you're doing it!

- The Desktop Revolution Continues • Multimedia Authoring Tools • The Macintosh Animator at Work • The Great Platform Shoot-Out • Creating New Worlds of Entertainment • New "New Media": Understanding Hybrid and Rich Technologies • Exploring Interface Design • Audio, Sound, and Music Tools • Taking Aim at Your Career Bull's-Eye • Entertainment Events on the Web.

F. The Getting-Started Conference.

Practical, focused, step-by-step approaches and guidelines for those who need a concentrated course of beginner's how-to's on Mac technologies and techniques.

- Getting Started with Telecommunications • A Beginner's Guide to the Internet • Getting Started with QuickTime • The Beginner's Guide to Publishing a CD-ROM • How to Create a Home Page • Design Principles for Non-Designers • Getting Started with Java.

G. The Small Office/Home Office (SOHO) Conference.

Never before has it been easier — or more fun! — to launch a small company or home-based business with a Mac, as millions of Macintosh users are now doing. Here, experts share their inside secrets on how YOU can make it happen too.

- Using the Latest and Greatest to Run Your Small Business • Small Business Success Secrets • Marketing Your Small Business with Your Mac • Small Business Startup: Tips, Tricks, and Techniques to Ensure Success • Mac & Me,™ Inc.: The Top Five Businesses to Start with a Mac.

H. The Tools Workshops.

Intensive training sessions on some of the most popular Macintosh tools, presented in a totally non-biased format by the award-winning staff of MacAcademy.

- Mastering the Macintosh: Beginner to Intermediate • Mastering the Macintosh: Intermediate to Advanced • FileMaker Pro • QuarkXPress • Adobe Illustrator • Adobe Photoshop • Macromedia Director.

I. The You-Asked-For-It-Conference.

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or see <http://www.mha.com/macworldexpo>

SPECIAL FEATURES

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The Keynote Sessions

There will always be a Macintosh in your future, and three dynamic keynote sessions at MACWORLD Expo/Boston catapult you closer to the excitement of tomorrow's promise — while putting you in touch with the next wave of Mac technologies.

Don't miss the insights, updates, and revelations by:

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Netscape Superstars James Barksdale and Marc Andreessen

Apple Fellow and Evangelist Guy Kawasaki

Keynotes: Wednesday, August 7, 9:30 am - 12:30 pm

John Hancock Center, 180 Berkeley Street, Boston

The Internet Technology Area

The Internet Technology Area is the premier showcase for Internet products at MACWORLD Expo/Boston. View the latest in Web, E-mail and Internet technologies in one high-profile location at the Bayside Expo Center.

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☐ Package One \$150

Conference Sessions and Exhibits.

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☐ Package Two \$25

Admission to Exhibits only.

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☐ Check if Applicable

I'm an international attendee. Please mail my badge by Federal Express. Enclosed is an additional \$45.

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If you are disabled and require special services, please attach a written description of your needs.

Pre-Register by July 8th and Save!

Please choose your package and fill out the form completely. Incomplete forms will be returned. One form per person; make photocopies for additional people. Payment must accompany form for registration to be complete. Purchase orders not accepted. Registration forms received after July 8th will be returned unprocessed. This form cannot be used for on-site registration. All registration fees are non-refundable. A \$20 fee will be charged for all returned checks. Confirmation of your registration will be sent to you within two weeks once registration is received.

U.S. Badges: will be mailed around July 22.

International Badges: (including Canadian) will be held on-site at the International Pre-registration Counter in the West Lobby of the Bayside Exposition Center.

International Badge Pick up Hours: August 6, 11:00 a.m. - 3:00 p.m.; August 7-9, 9:00 a.m. - 6:00 p.m.; August 10, 9:00 a.m. - 4:00 p.m.

Call 800-645-EXPO for more information.

2. CUSTOMER INFORMATION

MWP

Please check one: ☐ Home Address ☐ Company Address

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M.I.

LAST NAME

TITLE

COMPANY

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STREET ADDRESS

CITY

STATE/PROVINCE

ZIP CODE/POSTAL CODE

COUNTRY

TELEPHONE

EXTENSION

FAX

INTERNET/EMAIL ADDRESS

3. ATTENDEE PROFILE

WHAT IS YOUR INDUSTRY? (Check One Only)

- ☐ 1. Accounting/Finance
- ☐ 2. Aerospace
- ☐ 3. Architecture/Construction/Process Industries
- ☐ 4. Art/Design/Creative Services
- ☐ 5. Arts & Entertainment
- ☐ 6. Computer Reseller/VAR/VAD/Service
- ☐ 7. Consulting
- ☐ 8. Education
- ☐ 9. Engineering/R&D
- ☐ 10. Government/Military
- ☐ 11. Health/Medical Services
- ☐ 12. Legal Services
- ☐ 13. Manufacturing (Computer Industry)
- ☐ 14. Manufacturing (Non-Computer Industry)
- ☐ 15. Marketing/Sales/PR/Communications
- ☐ 16. Printing/Publishing
- ☐ 17. Transportation
- ☐ 18. Utilities
- ☐ 19. Other

WHAT IS YOUR JOB FUNCTION? (Check One Only)

- ☐ 20. Art Director/Graphics
- ☐ 21. Consultant

☐ 22. Controller/Treasurer/Accounting/CFO

- ☐ 23. Corporate Executive
- ☐ 24. DP/IS Management/CIO
- ☐ 25. Editorial/Writing
- ☐ 26. Educator
- ☐ 27. Engineering/Scientific/R&D
- ☐ 28. Human Resources
- ☐ 29. Management/Department Head
- ☐ 30. Marketing/Sales
- ☐ 31. Network Management
- ☐ 32. Professional (Lawyer, Doctor, etc.)
- ☐ 33. Programming/Analysis
- ☐ 34. Purchasing
- ☐ 35. Training
- ☐ 36. Other

WHAT IS THE SIZE OF YOUR ORGANIZATION?

- ☐ 37. Under 50
- ☐ 38. 50-99
- ☐ 39. 100-499
- ☐ 40. 500-999
- ☐ 41. 1000 & Over

WHICH PERSONAL COMPUTERS DO YOU USE? (Check all that apply)

- ☐ 42. Macintosh Powerbook Series/Duo Series

☐ 43. Macintosh II Series

- ☐ 44. Macintosh Performa Series
- ☐ 45. Macintosh Centris Series
- ☐ 46. Macintosh Quadra Series
- ☐ 47. Macintosh Workgroup Series
- ☐ 48. PowerMac
- ☐ 49. Newton
- ☐ 50. Mac clone
- ☐ 51. IBM PC or compatible desktop
- ☐ 52. IBM Laptop/Notebook
- ☐ 53. Other

HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?

- ☐ 54. 0
- ☐ 55. 1-10
- ☐ 56. 11-25
- ☐ 57. 26-50
- ☐ 58. 51-100
- ☐ 59. 101-500
- ☐ 60. 501+

ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?

- ☐ 61. Yes
- ☐ 62. No

WHICH APPLICATIONS DO YOU OR YOUR ORGANIZATION UTILIZE? (Check all that apply)

- ☐ 63. Accounting/Finance
- ☐ 64. Agenda Minder/Scheduler
- ☐ 65. CAD/CAM
- ☐ 66. CASE Tools
- ☐ 67. Database
- ☐ 68. Desktop Publishing
- ☐ 69. Digital Video
- ☐ 70. Education
- ☐ 71. Graphics
- ☐ 72. Multimedia
- ☐ 73. Project Management
- ☐ 74. Spreadsheet
- ☐ 75. Word Processing

WHICH (IF ANY) OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)

- ☐ 76. America OnLine
- ☐ 77. AT&T
- ☐ 78. CompuServe
- ☐ 79. Netscape
- ☐ 80. Prodigy
- ☐ 81. Other

4. PAYMENT METHOD

☐ Check enclosed (make payable to MACWORLD Expo)

☐ Master Card ☐ Visa ☐ American Express

AMOUNT \$

ACCOUNT NUMBER

EXPIRATION DATE

CARD HOLDER SIGNATURE (Signature necessary to be valid)

X

If card holder is other than registrant, please print card holder's name below:

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IMPORTANT

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Call Event Travel Services, the official travel agency for MACWORLD Expo, at 800-361-8191, 9:00 a.m. – 7:00 p.m. EST or fax ETS at

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Accommodation Restrictions

Hotel availability is limited and on a first-come, first-served basis. A credit card number with one night's non-refundable deposit is required when making your reservation. Hotel rates and availability are subject to change.

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Getting There, Once You're Here

Taking public transportation once you're in the city is highly recommended. Take the Red Line to the JFK/UMass stop; Bayside Expo will be within walking distance. Take the Red Line to South Station where you can take the free shuttle to the World Trade Center. The complimentary MACWORLD Expo shuttle will connect you with both Expo locations.

U.S. Attendees: Badges will be mailed on or about July 22. Be sure to check the box indicating where your badge should be sent.

International Attendees: International Badges (including Canadian) will be held for pick up at the International Pre-registration desk located in the West Lobby at the Bayside Expo Center. Badge pick up hours are: August 6, 11:00 a.m. - 3:00 p.m.; August 7-9, 9:00 a.m. - 6:00 p.m.; August 10, 9:00 a.m. - 4:00 p.m. For Federal Express service, check the appropriate box on the pre-registration form and add \$45 to your pre-registration fee. Fill in your exact street address (no P.O. boxes) and include your telephone number and country code. We will Federal Express your badge directly to you.

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Back Bay Hilton 40 Dalton St., Boston, MA 02115	\$163/184
Boston Marriott Copley 110 Huntington Ave., Boston, MA 02116	\$189/189
Boston Marriott Long Wharf 296 State St., Boston, MA 02109	\$239/259
Boston Park Plaza 64 Arlington St., Boston, MA 02116	\$152/174
Colonnade Hotel 120 Huntington Ave., Boston, MA 02116	\$195/220
Copley Plaza 138 St. James Ave., Boston, MA 02116	\$197/217
Doubletree Guest Suites 400 Soldiers Field Road, Boston, MA 02134	\$174/194
Four Seasons Hotel 200 Boylston St., Boston, MA 02116	\$290/320
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Hyatt Regency Cambridge 575 Memorial Dr., Cambridge, MA 02139	\$170/190
Le Meridien Hotel 250 Franklin St., Boston, MA 02110	\$224/250
Lenox Hotel 710 Boylston St., Boston, MA 02116	\$165/185
Logan Airport Hilton Logan International Airport, E. Boston, MA 02128	\$150/170
Omni Parker House 60 School St., Boston, MA 02108	\$150/170
Ritz-Carlton Hotel 15 Arlington St., Boston, MA 02117	\$280/320
Sheraton Boston Hotel & Towers 39 Dalton St., Boston, MA 02199	\$165/180
Sheraton Tara Braintree 37 Forbes Rd., Braintree, MA 02184	\$135/135
Swissôtel One Ave. de Lafayette, Boston, MA 02111	\$180/190
Westin Copley 10 Huntington Ave., Boston, MA 02116	\$195/220



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World Trade Center &
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August 7-10, 1996

Exhibit hours

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Aug. 10: 10:00 a.m. – 4:00 p.m.

Keynote

(open to conference attendees only)
Aug. 7: 9:30 a.m. – 12:30 p.m.
John Hancock Center
180 Berkeley Street, Boston

Conference hours

Aug. 7: 1:00 p.m. – 5:15 p.m.
Aug. 8-9: 11:30 a.m. – 5:15 p.m.
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Consumer Advocate

by Don Sellers

Finding a Computer-Savvy Doctor

PART ONE OF A TWO-PART SERIES

TINGLING IN FINGERS, pain in hands or wrists that doesn't disappear if you rest for 24 to 48 hours, loss of dexterity, muscle fatigue, loss of gripping strength, a sudden inability to perform normal tasks such as washing your hair or opening a jar—any of these complaints could be a symptom of RSI (repetitive strain injury) related to computer use. Soft-tissue injuries, the type most frequently associated with computer work, can be complex in origin, and as a result are often incompletely understood. Although a primary-care physician can successfully relieve many RSIs, other types resist routine treatment. To complicate the issue, there's no one medical specialty that is perfectly suited to treating RSI.

You may never suffer from RSI—most computer users don't—especially if you conscientiously practice safe techniques for computer work (see "Safer Computing," *Macworld*, December 1994). But if you ever do sustain a computer-related injury, obtaining prompt, appropriate treatment will greatly improve your chances for a complete recovery. The message from the frontline combatants—the clinicians and support organizations that work with RSI sufferers daily—is clear: to receive proper health care for RSI, you must educate yourself and become a strong advocate for yourself.

A Strong Foundation

Successful treatment for any medical complaint usually begins with finding a top-notch primary health care physician. Look for someone with whom you can form a trusting doctor-patient relationship, who will make time to discuss your problem and give you an adequate examination. Place high value on doctors who are familiar with your medical insurance and workers' compensation systems and

will willingly work on your behalf.

A primary-care physician, especially one well versed in soft-tissue injury, can treat many computer-related injuries successfully because often the appropriate treatment is standard and routine. But what happens when you don't respond to these simple regimes? A great primary-care physician will then act as your manager to help you get the proper treatment from specialists—the computer-savvy doctors—and negotiate the maze of the medical system.

Your primary-care physician will know the local specialists for most com-



plaints, but may have more trouble referring you for a computer-related injury. The myriad factors involved in these injuries don't fall neatly under one medical specialty, and even include nonmedical disciplines such as ergonomics (the study of human-machine interaction). Even so, there may be health-care professionals in your area who have taken a special interest in RSI, and acquired the knowledge and clinical experience to treat difficult cases successfully. If your physician doesn't know who they are, you may need to head the search yourself.

The Right Doc for the Job

Where do you look? Here are some tips for finding a computer-savvy doctor.

- Contact your local RSI support group, if one exists. These grassroots organizations are usually founded by injured computer users who share information and support. To locate one, call the Association for Repetitive Motion Syndromes (707/517-0397). Or contact the Committee on Occupational Safety and Health (COSH); there are 25 COSH groups scattered around the country. Call NYCOSH at 212/627-3900 for the number of the group nearest you. Or if you have Internet access, go online (see "RSI-Savvy Web Sites").

- Check out the types of practitioners most likely to be interested in this type of injury. Specialties often mentioned include occupational, physical, rehabilitative, and osteopathic medicine. Remember that computer-savvy practitioners can hang out in a variety of niches. Some specialize in orthopedic or hand surgery, others in neurology. Sometimes the computer-savvy practitioner is not a physician at all, but a physical therapist or chiropractor, for example.

- Search the yellow pages for clinics at teaching hospitals, which often provide the most up-to-date care.

- Network with people who have problems similar to yours, perhaps coworkers. Talk to them; ask them about their treatment and who provides it. If you are fortunate enough to work for a company with progressive safety and health policies, your best care may start just down the hall. Forward-thinking companies (those that train employees in safe-computing techniques, conduct regular ergonomic workstation evaluations,

continues

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and encourage the reporting of potential injuries) may provide excellent management of your problem. Sadly, some companies don't recognize the benefits of promoting a healthy workforce. With them, you may be well advised to make your inquiries discreetly.

- Remember, take action at the first sign of symptoms.

A Compliment to Alternatives

Many people who have suffered computer-related injuries find effective treatment in health disciplines some people regard as "alternative"—chiropractic, acupuncture, massage therapy, yoga, and Alexander and Feldenkrais techniques (two popular approaches to bodywork)—alone or combined with other approaches. In fact, many computer-savvy medical doctors recommend such alternatives as complements to their own treatment, but be aware that not all insurance companies cover nontraditional medical therapies.

Finding a practitioner—or a team of practitioners—is only the first step in making a recovery from RSI. Next month I'll talk about how to evaluate a doctor's suitability and how to get the most benefit from an office visit. I'll also provide some tips on battling the hydra-headed health bureaucracy.

DON SELLERS is a documentary filmmaker and author. His books include *Zap! How Your Computer Can Hurt You—and What You Can Do About It* (1994) and *25 Steps to Safe Computing* (1995), both from Peachpit Press.

THE AMCoEX INDEX OF USED MACINTOSH PRICES

Machine (RAM/Hard Drive)	Average Sale Price	Monthly Change
PowerBook 140 (4MB/40MB)	\$575	-\$25
PowerBook 165 (4MB/80MB)	\$820	-\$30
PowerBook 180 (4MB/80MB)	\$1100	-\$100
PowerBook Duo 230 (4MB/80MB)	\$750	\$0
Mac IIsi (5MB/40MB)	\$225	+\$25
Mac IIcx (4MB/80MB)	\$400	-\$50
Mac IIfx (4MB/80MB)	\$425	+\$25
Centris 650 (8MB/230MB)	\$825	-\$75
Quadra 800 (8MB/230MB)	\$1125	+\$50
Quadra 900 (8MB/160MB)	\$975	-\$50
Power Mac 7100/B0 (8MB/350MB)	\$1400	-\$75
Power Mac B100AV (8MB/500MB)	\$2175	-\$75

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during the week of March 20, 1996. Configurations include keyboard and exclude monitor and display board for noncompact models.

RSI-Savvy Web Sites

The RSI Page (<http://engr-www.unl.edu/ee/eeshop/rsi.html>) leads you to FindADoc, a geographical list of health-care providers who have been recommended by computer-injury sufferers. The list is still growing and may not yet show anyone near you, but new practitioners are added periodically (please share your recommendations). The RSI Page also includes a national list of support groups and supplemental information on computer injury.

The other must-visit site is the Typing Injury FAQ and Typing Injury Archive (<http://www.cs.princeton.edu/~dwallach/tifaq/>). Here you can find out about the many mailing lists and newsgroups devoted to the subject on the Internet. (I hereby nominate Dan Wallach, who maintains this site, and Paul Marxhausen, who maintains the RSI Page, as Service Heroes. Their selfless labor makes these valuable resources.)

Visit the resources section of my site (<http://www.zap.com>) for a current list of regional COSH groups.

Letters

A Question of Semantics "Shareware Picks" in the May *NetSmart* uses the word *shareware* as if it subsumed freeware. Confusing the words in this way does a disservice to both shareware and freeware authors. Freeware authors are hurt by

having their products listed as shareware, since users may erroneously assume that they are expected to pay if they keep the product. And using the word to denote free software obscures the fact that people should pay authors for shareware they use. This confusion of terms is widespread, but if *Macworld's* editors kept an eye on the misuse of the terms, everyone would be helped.

GARY MCGATH
via the Internet

That's a good point. The sloppy tendency to use one word to refer to many things can be confusing. In this case it can mislead consumers continues

Circle 80 on reader service card

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Kai's Wild Card:

Kai Krause, the designer behind MetaTools, the visual computing software company

From PageMill to the Web: Russell Brown

Desktop Video Magic: George Jardine

Bryce 2: Harry St. Ours

Director 5: Douglas Mitchell

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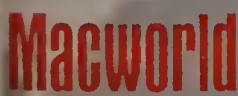
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Bugs and Turkeys



America Online version 2.6 freezes during art downloads when you connect through TCP/IP. If you force-quit AOL or restart the Mac while frozen, you risk corrupting your AOL Online Database. AOL is aware of the problem but doesn't know when it will be fixed. According to AOL's online tech support, you should keep a copy of the Online Database in your AOL folder, so if the original becomes corrupted, you can pop in the backup copy. America Online, 703/448-8700.



AT&T's new Internet service, WorldNet, does not currently provide connection software for the Macintosh platform. (Windows users can currently order software, and can register and log on to WorldNet at <http://www.att.com>.) WorldNet's tech-support staff informs us that the Macintosh software will be available "sometime this year." AT&T's special offer of five free hours per month and \$2.50 per additional hour, or unlimited service for \$19.95 per month, will also be extended to Macintosh users when the software becomes available. WorldNet, 800/967-5363.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

about what they're expected to pay. The term shareware is commonly applied to all kinds of software that's freely shared—from freeware, which has absolutely no strings attached, to post-cardware (your payment is to send the author a postcard), to smileyware (give your neighbor a big grin), to those shareware programs whose authors request a voluntary payment (usually under \$25). Macworld is careful to make clear distinctions when we talk about specific pieces of software, but until a better word catches on, shareware is today's shorthand of choice.

Still, consumers who download shareware should be careful to check out the terms of use. Macworld Online and AOL offer a predownload description that often includes the price, but almost all shareware comes with a Read Me file that includes the latest release notes, how to con-

tact the author, and of course, where to send your check. And do follow through on that payment—whatever form it takes. For more information on the subject, visit the Macworld Software Library FAQ (<http://www.macworld.com/static/swLibraryfaq.html>).—Ed.

Service Hero Sometimes it's just one of those days, as reader Richard Cummins of Highland, California, discovered recently. His home-based business relies on a Pinnacle Micro RCD-1000 CD recorder to burn CD-ROMs. When the CD-R stopped working on the day a client expected delivery of several CDs, Cummins came close to panicking. He called Pinnacle Micro's tech support, only to learn it would take 48 hours to have his equipment back and functioning. He asked if he could drop off the RCD-1000 at the service center, about an hour's drive away. He got the go-ahead, grabbed his toddler and his CD-R, and took off.

Technician Joe Lusker met Cummins at the service center and whisked the drive into the back while Cummins and tot waited in the lobby. Less than half an hour later, Lusker had a functioning recorder—and a happy client. **m**

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Consumer Advocate* at Macworld, 501 Second St., San Francisco, CA 94107, or send us a fax at 415/442-0766.

Streetwise Shopper

Ray Dream Studio 1.0 This 3-D design package (May 96 ★★ ★/6.9), with a suggested retail price of \$499, is available for \$299 direct from Ray Dream while supplies last. Designer 3.0 owners can upgrade to Ray Dream Studio for \$149 until July 31. Call Ray Dream, 415/960-0765.

Speed Doubler 1.0.2 This \$99 bundle includes Speed Doubler 1.0.2 (Feb 96 ★★ ★/8.9), RAM Doubler 1.5, and SAM 4.0 (Mar 94 ★★ ★ version 3.5.8), while supplies last. Call MacMall, 800/222-2808.

Fractal Dabbler 2 Konica has licensed a special Photo Edition of Dabbler for use in conjunction with its PC PictureShow software. Konica-serviced photo retailers began offering the software in April. Call Konica Photo Services, 860/289-0300.

Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a Macworld product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword *Macworld* on America Online; URL <http://www.macworld.com> on the World Wide Web).

Vendors: Please write to Macworld Star Ratings, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

s o f t w a r e

BUSINESS TOOLS

- ★★★★/8.8 **4th Dimension 3.5**, ACI US, 408/252-4444, \$895. Leading Mac database gets important improvements. *Mar 96, p. 60*
- ★★ **Adobe Acrobat 2.0 (2.1)**, Adobe Systems, 415/961-4400, \$195. The font fidelity of this portable-document software is uneven. *Mar 95, p. 59*
- ★★★ **Adobe Acrobat for Workgroups 2.0 (2.1)**, Adobe Systems, 415/961-4400, \$1595. Portable-document software for workgroups is inexpensive but resource-intensive. *Mar 95, p. 59*
- ★★★★ **ArcView 2.1**, Environmental Systems Research Institute, 909/793-2853, ext. 2050, \$995. Sophisticated GIS program is easy to customize. *Jan 96, p. 55*

- ★★★★/9.7 **Data Desk 5.0**, Data Description, 607/257-1000, \$625. Classic statistics program adds dazzling new features. *Mar 96, p. 79*
- ★★★★ **DeltaGraph Pro 3.5**, DeltaPoint, 408/648-4000, \$195. Easy-to-use graphing software stands out from the pack. *Jan 96, p. 57*
- ★★★ **Equate 1.0**, Holosoft, 408/748-9648, \$99. Newton spreadsheet is compatible with Excel. *Oct 95, p. 85*
- ★★★★/8.2 **FileMaker Pro 3.0**, Claris, 408/727-8227, \$199. Database favorite goes relational, works the Web. *Apr 96, p. 56*
- ★★★★ **Helix Express 3.03**, Helix Technologies, 708/465-0242, \$589. Latest release of visually oriented database adds speed and features. *Sep 95, p. 65*
- ★★★/6.1 **Mac Manager 3.1**, ELS, 352/375-0558, \$79. Desktop security takes on a Copland-style look, complete with a few ragged edges. *May 96, p. 78*
- ★★★★ **MapInfo 3.0**, MapInfo, 518/285-6000, \$1295. Mapping software includes advanced geographic-analysis and geocoding tools. *Oct 95, p. 66*
- ★★/4.4 **MapLinX 3.0**, MapLinX, 214/231-1400, \$149.95. This data-mapping program is a useful tool if you only need to see where your customers are located. *Apr 96, p. 82*
- ★★/4.6 **McAfee VirusScan**, McAfee Associates, 408/988-3832, \$65. Virus-detection package falls short on features compared with other commercial competitors. *May 96, p. 74*
- ★★★ **Meeting Maker XP 3.1**, On Technology, 617/374-1400, \$249; \$890 for 10 users. Group scheduling program is useful for small and midsize businesses. *Jan 96, p. 69*
- ★★★★ **Microsoft Excel 5.0**, Microsoft, 206/882-8080, \$339. A wealth of powerful features but huge hardware requirements. *Jan 95, p. 54*
- ★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6)**, Microsoft, 206/882-8080, \$495. The relational database offers fast searching but an uneven interface for users. *Apr 94, p. 56*
- ★★★ **PhoneDisc 95 PowerFinder**, Digital Directory Assistance, 617/639-2900, \$249. CD-ROM-based phone directory is convenient, but must be updated periodically. *Oct 95, p. 91*
- ★★★ **Phyla 1.0.3**, Mainstay, 805/484-9400, \$495. While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. *Aug 95, p. 85*
- ★★★ **QuickFigure Pro 2.1**, PelicanWare, 503/221-1148, \$49.95. Newton spreadsheet includes charting and linear equation solving. *Oct 95, p. 85*

COMMUNICATIONS/NETWORKS

- ★★★★ **Apple Mobile Message System**, Apple Computer, 408/996-1010, \$549; \$19.95 per month. Multifaceted remote-messaging service helps you keep in touch. *Sep 95, p. 74*
- ★★★★ **ASAP 1.5**, MicroBeam, 813/546-2727, \$695; \$795 with Windows client program. Convenient utility makes file-transfer operations quick and easy. *Sep 95, p. 72*
- ★★★ **Claris EMailer 1.0**, Claris, 408/727-8227, \$89. E-mail-management program offers impressive features at a good price. *Dec 95, p. 62*
- ★★★★/8.0 **CommuniGate 1.0**, Stalker Software, 415/383-7164, free for 5 users; 25 users \$200; unlimited users \$600; gateway modules \$100 each. CommuniGate lets you send mail, faxes, print jobs, and electronic pages. *Apr 96, p. 63*
- ★★/4.6 **COPSTalk for Windows 1.2f**, CoOperative Printing Solutions, 770/840-0810, \$179 per user. Windows 95-compatible software gives PCs AppleTalk capability. *Mar 96, p. 67*
- ★★★ **CreativePartner**, emotion Inc., 415/812-9000, \$1500. Collaboration tool distributes video, sound, text, and graphics over a network. *Jul 95, p. 69*
- ★★★★/5.8 **CU-SeeMe 1.0**, White Pine Software, 603/886-9050, freeware. Great for avoiding long-distance phone charges, but Internet is poor vehicle for video transmission. *May 96, p. 82*
- ★★★★/7.4 **DragNet 1.03**, OnBase Technology, 714/830-5682, \$39.95. DragNet helps you sort and categorize Internet addresses. *May 96, p. 52*
- ★★★★ **FileWave 2.1.2**, Wave Research, 510/704-3900, \$895. Update LAN users with this easy-to-use software-distribution tool. *Jul 95, p. 63*
- ★★★ **GrabNet 1.0**, ForeFront Group, 713/961-1101, \$19.95. Simple, affordable utility captures Web pages. *Nov 95, p. 85*
- ★★/1.4 **httpd4Mac 13b**, Bill Melotti, free. Minimalist freeware: feature-poor and unreliable Mac Web server. *Apr 96, p. 86*
- ★★★★/5.2 **InterServer Publisher 1.0.1**, Intercon, 703/709-5500, \$795. Fast and functional, but missing key features and documentation. *Apr 96, p. 86*
- ★★★★/6.4 **LANsurveyor 3.0**, Neon Software, 510/283-9771, 5 zones, \$395; unlimited zones, \$695. LANsurveyor maps and monitors your AppleTalk network. *May 96, p. 70*
- ★★★★ **MacAdministrator**, Hi Resolution, 508/463-6956, \$395 (10-user pack). Group administration tool is a great helper for network administrators. *Dec 95, p. 75*
- ★★★/6.3 **MachTen 4.0**, Tenon, 805/963-6983, *continues*

Star Ratings

\$695. Fast but hard to use, requiring Unix administration skills. *Apr 96, p. 86*

★★/4.0 **MacHTTP 2.2**, Quarterdeck/StarNine, 510/649-4949, \$95. Capable Mac Web server shareware but unreliable under heavy load. *Apr 96, p. 86*

★★★/5.0 **MailKeeper 1.0.2**, Nisus Software, 619/481-1477, \$35. Quick online information database could be more convenient. *Apr 96, p. 70*

★★★★/7.4 **Navigator 2.0**, Netscape Communications, 415/528-2555, \$49 without manual, \$69 with manual. Netscape pushed beyond Web browsing. *May 96, p. 50*

★★★★/7.8 **NetPresenz 4.0**, Stairways Shareware, no phone, \$10 (shareware). Internet server on a shoestring. *May 96, p. 55*

★★★/6.9 **PageMill 1.0**, Adobe Systems, 415/961-4400, \$149. Drag-and-drop Web publishing software masks HTML complexities. *Mar 96, p. 56*

★★★★/8.8 **PageNow 1.5**, Mark/Space Softworks, 408/293-7299, \$119. Alphanumeric paging software gets the message across. *Mar 96, p. 70*

★★★/5.8 **Personal MacLAN Connect 5.51**, Miramar Systems, 805/966-2432, \$199 per user. This Windows 95-compatible software lets PC and Macintosh users communicate via AppleTalk. *Mar 96, p. 67*

★★★★ **ProTerm Mac 1.0**, InTrec Software, 602/992-5515, \$129.95. Communications program is fast, reliable, and stable. *Jul 95, p. 71*

★★★ **QuickMail 3.0 (3.5)**, CE Software, 515/221-1801, \$199 to \$3799. Good choice for most people, though rule-based features are incomplete. *Jan 95, p. 59*

★★★ **Saber LAN Workstation**, Saber Software, 214/361-8086, \$199 plus \$49 per node. LAN-management package is a useful tool for the price. *Aug 95, p. 73*

★★★★ **Skyline/Satellite**, AG Group, 510/937-7900, 1-station pack \$795; 5-station pack \$1195; 10-station pack \$1995. Remote monitoring engines keep an eye on LAN traffic. *Sep 95, p. 74*

★★★ **SnapMail 2**, Casady & Greene, 408/484-9228, \$250 (5 users); \$420 (10 users); \$1940 (50 users). E-mail software is easy to install, but its gateway interface is kludgy. *Dec 95, p. 75*

★★★★ **Snatcher 1.0**, Software Ventures, 510/644-3232, \$49.95. Simple, efficient FTP tool lets you connect to multiple sites simultaneously. *Aug 95, p. 81*

★★★/5.5 **Timbuktu Pro for Networks 2.0**, Farallon, 510/814-5000, single user \$139; 2-user pack \$189; 100-user pack \$3999. Remote-control and file-sharing standby gets a ho-hum upgrade. *May 96, p. 68*

★★ **TurboTalk 1.0**, Information Presentation Technologies, 805/541-3000, \$160 to \$495. Network utility's performance is unimpressive on some network configurations. *Oct 95, p. 83*

★★★★/7.3 **WebStar 1.2.1**, Quarterdeck/StarNine, 510/649-4949, \$795. Polished, capable, reliable, easy to use, and reasonably fast Mac Web server. *Apr 96, p. 86*. **Editors' Choice** for best Web server software.

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0**, Adobe Systems, 206/622-5500, \$895. Page-layout program's upgrade includes practical and powerful improve-

ments. *Nov 95, p. 60*

★★★ **ColorDrive 1.0**, Pantone, 201/935-5500, \$199. Color-management software supports a broad range of color models. *Nov 95, p. 70*

★★★★/7.2 **FontMonger 1.5.7**, Ares Software, 415/578-9090, \$149.95. Easy font modifications, from redrawing characters to converting font formats. *Apr 96, p. 102*

★★★★ **FrameMaker 5.0**, Adobe Systems, 408/975-6000, \$895. Page-layout program is a good choice for technical-document creation. *Nov 95, p. 63*

★ **HoTMetal Pro 2.0**, SoftQuad, 416/239-4801, \$195. Web authoring software is hampered by a poorly designed interface. *Jan 96, p. 65*

★★★★ **Icefields 2.3**, The Color Partnership, 619/259-8688, \$895. Professional printers will appreciate this stochastic-screening software. *Nov 95, p. 75*

★★★★/7.0 **PageTools 2.0**, Extensis, 503/274-2020, \$99.95. Plug-ins add power and precision to PageMaker. *May 96, p. 65*

★★★★ **QuarkXPress 3.2 (3.31)**, Quark, 303/894-8888, \$895 (\$995 for Power Macintosh). A must-have layout tool for color publishers. *Nov 93, p. 51*

★★★★/7.4 **theTypeBook 4.02b**, Rascal Software, 805/255-6823, \$49.95. Creates font reference books from ready-to-print specimen pages. *Apr 96, p. 102*

EDUCATION/ENTERTAINMENT

★★★ **AmoebArena 1.0**, Casady & Greene, 408/484-9228, \$49.95. Engaging strategy game pits amoeboid against amoeboid. *Jan 96, p. 75*

★★★★/8.6 **The Cartoon Guide to Physics**, HarperCollins Interactive, 212/207-7000, \$49.95. Entertaining introduction to basic kinematics. *Apr 96, p. 78*

★★★★ **The Daedalus Encounter**, Virgin Interactive Entertainment, 714/833-8710, \$59.95. Escape from a doomed spacecraft in this interactive adventure. *Sep 95, p. 73*

★★★★/8.5 **Descent 1.0**, MacPlay, 714/553-3530, \$49.95. Which way is up? This adventure game's 360-degree 3-D maneuverability will leave you spinning. *Apr 96, p. 72*

★★★ **FrenchNow 3.0**, Transparent Language, 603/465-2230, \$99 to \$129. While it doesn't replace a class, software can help you learn French. *Dec 95, p. 83*

★★★★ **Full Throttle**, LucasArts, 415/472-3400, \$49.95. Biker adventure game is witty and action-packed. *Jan 96, p. 73*

★★★/6.9 **Fun With Electronics**, Philips Media, 310/444-6500, \$44.99. Multimedia updates a hobby-shop classic. *May 96, p. 80*

★★ **Haight-Ashbury in the Sixties**, Compton's NewMedia, 619/939-2500, \$49.95. If you can remember the sixties, you probably don't need this CD-ROM. *Dec 95, p. 84*

★★★★/8.8 **In the 1st Degree**, Brøderbund, 415/382-4700, \$49.95. Realistic, interactive legal thriller. *Apr 96, p. 80*

★★★ **King's Quest VII: The Princeless Bride**, Sierra Online, 206/649-9800, \$59.95. Adventure game is entertaining, but adults might find its plot silly. *Jan 96, p. 75*

★★/4.4 **Learn the Art of Magic**, Brøderbund, 415/382-4700, \$35. Lots of tricks to learn, but the on-camera magician is unbearably irritating. *May 96, p. 62*

★★★/5.6 **Learn to Speak Spanish 6.0**, The Learning Company, 510/792-2101, \$109. Comprehen-

sive, but doesn't adapt to your needs or progress. *May 96, p. 60*

★★★ **The Legend of Kyrandia, Book 3**, Virgin Interactive Entertainment, 714/833-1999, \$34.95. Enjoyable adventure game features good graphics and sound. *Jan 96, p. 77*

★★★★ **Links Pro CD**, Access Software, 801/359-2900, \$69.95. An excellent simulation of golf's many challenges. *Jan 96, p. 73*

★★★★ **The Lost Mind of Dr. Brain**, Sierra Online, 206/649-9800, \$44.95. Hilarious brainteasers are presented in an imaginative, arcade style. *Oct 95, p. 93*

★★★★/7.0 **Magic: An Insider's View**, HarperCollins Interactive, 212/207-7000, \$39.95. Superb on-camera magician, stale between-trick segments. *May 96, p. 62*

★★★★/8.5 **Marathon 2: Durandal**, Bungie Software Products, 312/563-6200, \$79. A well-crafted action-adventure game, but it's not for the squeamish or those disturbed by violence. *Mar 96, p. 85*

★★★★ **Math Workshop**, Brøderbund Software, 415/382-4700, \$40. Youngsters can have some fun while learning math. *Aug 95, p. 89*

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM**, Merriam-Webster, 413/734-3134, \$69.95. Powerful search capabilities don't make up for this dictionary's interface flaws. *Nov 95, p. 79*

★★★★ **Nile: Passage to Egypt**, Discovery Channel Multimedia, 301/986-1999, \$49.95. Armchair adventurers will enjoy this multimedia journey on CD-ROM. *Oct 95, p. 93*

★★★ **Out of the Sun**, Domark software, 415/513-8929, \$44.95. Flight-simulation game presents historic and custom battle scenarios. *Jan 96, p. 77*

★★★★ **Passage to Vietnam**, Against All Odds Productions/Interval, 800/558-3388, dept. 100, \$39.95 to \$59.95. Stunning photojournalism CD-ROM sets a new standard for multimedia projects. *Dec 95, p. 83*

★★★★/7.5 **RedShift 2**, Maris Multimedia, 415/492-2819, \$54.95. RedShift 2 lets you explore space from any planet. *May 96, p. 71*

★★★/6.2 **Spanish Native Guide 1.0**, Native Guide Software, 415/802-8085, \$49.95. Adapts to your progress, but pronunciation help is missing. *May 96, p. 60*

★★★/5.3 **Spanish Now 4.0**, Transparent Language, 603/465-2230, \$129. Engaging approach, but poor documentation and confusing interface. *May 96, p. 60*

★★★/6.6 **Table Magic**, Arc Media, 416/410-4429, \$19.95. Few tricks, but the ones that are here are original. *May 96, p. 62*

★★★★/8.9 **You Don't Know Jack**, Berkeley Systems, 510/540-5535, \$30. "Jeopardy!" with a bad attitude. *Mar 96, p. 85*

FINANCE/ACCOUNTING

★★★★/7.1 **Kiplinger TaxCut 95 1995**, Block Financial Software, 816/751-6000, \$39.95; state modules \$24.95. Tax-prep program has easy-to-use interface and elegant organization, but lacks a state version. *Apr 96, p. 66*

★★★★/8.6 **MacInTax Deluxe 1995**, Intuit, 520/295-3110, \$49.95; state modules \$25. Not only guides you effortlessly through your return, but also gives helpful financial-planning advice. *Apr 96, p. 66*

★★★★ **Managing Your Money 7.0**, MECA Software, 203/255-1441, \$79.95. Personal financial software includes advanced investment features.

Oct 95, p. 81

- ★★★★ **M.Y.O.B. 5.0**, BestWare, 201/586-2200, \$139 (\$239 with payroll). Well-designed interface makes double-entry accounting easy. May 95, p. 63
- ★★★/5.2 **Personal Tax Edge 1995**, Parsons Technology, 319/395-9626, \$19; state modules \$19. Produces high-quality printed forms but has DOS-inspired interface. Apr 96, p. 66
- ★★★ **QuickBooks 3.0**, Intuit, 415/322-0573, \$119. Double-entry accounting program is easy to use but not entirely Mac-like. Jun 95, p. 58
- ★★★★/8.3 **Quicken Deluxe 6**, Intuit, 520/295-3220, \$59.99. The best-selling package gets bigger and mostly better. Feb 96, p. 65
- ★★/4.9 **WealthBuilder 4.01**, Reality Online, 610/277-7600, \$49.95. This financial planner doesn't quite add up. May 96, p. 74

GRAPHICS

- ★★★ **AddDepth 2.0**, Ray Dream, 415/960-0768, \$99. 3-D effects software provides a simple way to give depth to illustrations. Nov 95, p. 81
- ★★★★/8.4 **Adobe After Effects 3.0**, Adobe Systems, 415/961-4400, \$995 base version; \$1995 Production Bundle. Must-have video-design package enhances motion control and adds effects. Mar 96, p. 54
- ★★★★/7.1 **Adobe Illustrator 6.0**, Adobe Systems, 415/961-4400, \$595. Don't let the version number fool you: this is a minor upgrade. Its minor tweaks aren't enough to surpass FreeHand 5.5. Apr 96, p. 54
- ★★★★/6.3 **Adobe PhotoDeluxe 1.0**, Adobe Systems, 415/961-4400, \$129. "Photoshop Lite" makes questionable compromises in order to appeal to consumer market. Apr 96, p. 59
- ★★★★ **Adobe Photoshop 3.0 (3.0.4)**, Adobe Systems, 415/961-4400, \$895. Broader capabilities combine with simplified work environment. Jan 95, p. 52. **Editors' Choice** for best image editor. Feb 95, p. 112
- ★★★★/7.4 **Adobe Premiere 4.2**, Adobe Systems, 415/961-4400, \$795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. Mar 96, p. 90
- ★★★ **Adobe TextureMaker 1.0 (2.0)**, Adobe Systems, 415/961-4400, \$199. Texture generator creates backgrounds for multimedia or printed projects. Oct 95, p. 89
- ★★★ **Alien Skin Textureshop 1.0**, Virtus, 919/467-9700, \$99. Apply random mutations to master textures to create custom patterns. Jul 95, p. 81
- ★★★ **Black Box 2.0**, Alien Skin Software, 919/832-4124, \$119. Photoshop image filters are useful and worth their modest price. Nov 95, p. 87
- ★★★★/6.9 **Boris Effects 1.01**, Artel Software, 617/566-0870, Premiere version \$350; Media 100 version \$695. Plug-in for Premiere and Media 100 adds video-effects control. Feb 96, p. 85
- ★★★ **Canvas 3.5 (3.5.2)**, Deneba Software, 305/596-5644, \$399. Lots of features but confusing interface. Jan 94, p. 49
- ★★★ **CD-Q 2.0**, Human Software Company, 408/741-5101, \$145. Photoshop plug-in facilitates color corrections and separations on Photo CDs. Jul 95, p. 65
- ★★/1.5 **Chagall 2.0.2**, Technosystems USA, 502/351-0108, \$299. Image-editing application flunks test. Feb 96, p. 78
- ★★★★/8.0 **Claris Impact 2.0**, Claris, 408/987-7000, \$99. Easy and affordable business-graphics software. Feb 96, p. 66
- ★★★★ **Color It 3.0**, MicroFrontier, 515/270-8109, \$149.95. Venerable paint program has been updated with powerful new features. Aug 95, p. 75
- ★★★ **Colorize 2.0**, DS Design, 919/319-1770, \$495. Colorizing software is effective, but expensive for a one-trick pony. Dec 95, p. 81
- ★★★★/7.5 **Dabbler 2**, Fractal Design, 408/688-5300, \$69. Drawing package offers an easy, affordable natural painting option. Mar 96, p. 63
- ★★★★/7.3 **DrawTools 1.0**, Extensis, 503/274-2020, \$149. Extensions add color, shape, and object tools to FreeHand and Illustrator. Feb 96, p. 71
- ★★/4.5 **Envelopes 1.0**, Letraset USA, 800/343-8973, \$99. Distorts objects but inserts extraneous anchor points as well. Mar 96, p. 106
- ★★ **FloorPlan Plus 1.1**, ComputerEasy International, 602/829-9614, \$49.95. Affordable 2-D CAD program is intended for rudimentary design tasks. Sep 95, p. 85
- ★★★ **FullPixelSearch 1.5**, Avian Systems, 201/224-2025, \$1295. Analyze scientific images with a variety of pixel-selection functions. Jul 95, p. 79
- ★★★★ **Infini-D 3.0**, Specular International, 413/253-3100, \$899. 3-D software does professional-quality rendering and animation. Jan 96, p. 54
- ★★/3.3 **Infinite FX 1.0**, BeInfinite, 404/552-6624, \$149. Many automated reshaping effects, mired by poor organization. Mar 96, p. 106
- ★★★ **IntelliHance 1.0**, DPA Software, 214/517-6876, \$129 to \$299. Photoshop plug-in automates the process of improving scanned graphics. Sep 95, p. 71
- ★★★★/8.3 **Kai's Power Tools 3.0**, MetaTools, 805/566-6200, \$199. More-powerful plug-ins, more-baffling interface. Feb 96, p. 57
- ★★★★ **KPT Convolver 1.0**, MetaTools, 805/566-6200, \$199. Imaginative and absorbing plug-in module creates Photoshop filters. Aug 95, p. 71
- ★★★★/8.9 **KPT Final Effects 3.0**, MetaTools, 805/566-6200, \$695. Superb effects library for Adobe After Effects. Apr 96, p. 69
- ★★★★/8.5 **KPT Vector Effects 1.0**, MetaTools, 805/566-6200, \$199. Combines excellent experimentation functions with thoughtful interface design. Mar 96, p. 106. **Editors' Choice** for best natural draw software.
- ★★★/6.2 **LightningDraw GX 1.0**, Lari Software, 919/968-0701, \$299. Lets you combine colors and shapes and experiment with QuickDraw GX fonts. Mar 96, p. 106
- ★★★★ **Live Picture 2.0**, HSC Software, 805/566-6200, \$995. The latest version of this innovative image editor boasts many improvements. Sep 95, p. 62
- ★★★★ **MacPhase 2.0**, The Otter Solution, 315/768-3956, \$279. Feature-rich program offers scientific and graphics image processing tools. Aug 95, p. 85
- ★★★★/8.1 **Macromedia FreeHand 5.5**, Macromedia, 415/252-2000, \$595. Draw program outperforms competitor, for now. Feb 96, p. 74
- ★★★★/8.5 **MapArt Cartographic Data Bank 1.0**, Cartesia Software, 609/397-1611, \$249 per volume, \$399 for both. Detailed, editable maps spice up your layouts. May 96, p. 72
- ★★★★/7.8 **MapArt Designer Series 1.0**, Cartesia Software, 609/397-1611, \$129 per volume, \$199 for both. Detailed, editable maps spice up your layouts. May 96, p. 72
- ★★★★/8.1 **MiniCad 6**, Graphsoft, 410/290-5114, \$795. Nothing's small about this modular package. Mar 96, p. 65

continues



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Star Ratings

- ★★★★ **Paint Alchemy 2.0**, Xaos Tools, 415/487-7000, \$199. Flexible image editor is an appealing add-on for digital artists. *Sep 95, p. 70*
- ★★★★★/9.4 **Painter 4**, Fractal Design, 408/688-5300, \$549. Near-perfect painting program just got even better. *Mar 96, p. 58*
- ★★★ **PhotoFix 2.8.8**, Microspot USA, 408/253-2000, \$249. Image-editing/photo-enhancement program is a useful tool. *Sep 95, p. 81*
- ★★★ **PhotoFlash 2.0**, Apple Computer, 408/996-1010, \$129. Image-editing utility provides basic image-retouching tools at a reasonable price. *Jul 95, p. 67*
- ★★ **PhotoFusion 2.0.3**, Ultimate, 818/993-8007, \$695. Photoshop compositing plug-in is hampered by a poor interface. *Oct 95, p. 83*
- ★★★★ **Poser 1.0**, Fractal Design, 408/668-5300, \$199. 3-D illustration tool generates posable human figures. *Oct 95, p. 63*
- ★★★★ **PowerCADD 2.0**, Engineered Software, 910/299-4843, \$795. CAD program features exceptional speed and an extensive array of tools. *Oct 95, p. 77*
- ★★★★★/7.2 **QX-Tools 1.0**, Extensis, 503/274-2020, \$149. Ten XTensions that make QuarkXPress more powerful. *Feb 96, p. 73*
- ★★★ **Ray Dream Designer 3.1.1**, Ray Dream, 415/960-0768, \$349. 3-D graphics program provides competent modeling tools and excellent rendering. *Mar 95, p. 61*
- ★★★★/6.9 **Ray Dream Studio 1.0**, Ray Dream, 415/960-0765, \$499. These 3-D design tools are competent and affordable. *May 96, p. 58*
- ★★ **Select 1.6**, Human Software, 408/741-5101, \$245. CMYK color-correction plug-in duplicates many Photoshop functions. *Jul 95, p. 81*
- ★★★★★/8.7 **SmartSketch 1.0**, FutureWave Software, 619/637-6190, \$69.95. Makes drawing and editing paths as easy as painting. *Mar 96, p. 106*. **Editors' Choice** for best natural draw programs.
- ★★★★/6.5 **theFONDler 4.0.1**, Rascal Software, 805/255-6823, \$69.95. Font utility diagnoses problems. *Apr 96, p. 84*
- ★★★★/5.0 **Tracer 1.0**, ScanVec, 508/694-9488, \$795. Excellent but expensive autotracing. *Feb 96, p. 85*
- ★★★★ **Transverter Pro 3.0**, TechPool Studios, 216/382-1234, \$395. Graphics-conversion tool deserves a place in every desktop publisher's toolbox. *Nov 95, p. 77*
- ★★★★★/8.7 **upFront 2.0.1**, SketchTech, 612/379-1435, \$299. A new vendor—SketchTech—improves Alias's venerable entry-level 3-D modeling package. *Mar 96, p. 86*
- ★★★★ **Vision 3d 4.0**, Strata, 801/628-5218, \$695. 3-D modeling, rendering, and animation package offers excellent tools. *Jul 95, p. 56*
- ★★★ **Working Model**, Visual Basic, 415/574-7777, \$2495. Motion-simulation system is a fine product, but a Power Mac version is needed. *Dec 95, p. 79*
- ★★ **xRes 1.11**, Fauve Software, 415/543-7178, \$799. Image editor applies a variety of effects to selected areas of a large composition. *Jul 95, p. 60*

MATH/SCIENCE

- ★★★★ **The Fuzzy Logic Toolbox 1.0**, MathWorks, 508/653-1415, \$895. Math-simulation aid incorpo-

rates fuzzy logic into models. *Sep 95, p. 89*

- ★★★★★/7.5 **Igor Pro 2.0.4**, WaveMetrics, 503/620-3001, \$495. Top-notch scientific graphing package. *Feb 96, p. 90*
- ★★★★ **LabView 3.1**, National Instruments, 512/794-0100, \$1995. Instrumentation software can emulate most scientific and electronic test-bench instruments. *Nov 95, p. 62*
- ★★★★★/7.4 **Spreadware Statistics Menu 4.0**, Spreadware, 619/772-1758, \$229. Excel users can put Spreadware's statistics to work in minutes. *Apr 96, p. 72*
- ★★★★★/7.1 **SPSS 6.1**, SPSS, 312/329-2400, \$695; modules \$395 to \$495. Mainframe statistics giant has new Mac interface. *Feb 96, p. 82*
- ★★★★★/8.3 **StatView 4.5**, Abacus Concepts, 510/540-1949, \$595. Statistics and graphing package. *Feb 96, p. 81*

ORGANIZATION/PRODUCTIVITY

- ★★★★ **ClarisWorks 4.0**, Claris, 408/727-8227, \$129. Integrated program's word processor and database are superb. *Oct 95, p. 62*. **Editors' Choice** for best integrated software. *Nov 95, p. 124*
- ★★/3.7 **Day-Timer Organizer 2.0**, Day-Timer Technologies, 415/572-6260, \$59.95. PIM has some rough edges. *Mar 96, p. 92*
- ★★★ **FastTrack Schedule 3.0**, AEC Software, 703/450-1980, \$299. Updated version of this project planner includes customizable features. *Aug 95, p. 79*
- ★★★★ **In Control for Workgroups 3.5**, Attain, 617/776-1110, \$149.95; 10-pack \$949.95. Flexible project planner/scheduler combines an outliner and a calendar. *Sep 95, p. 93*
- ★★★ **InfoGenie 1.0.5**, Casady & Greene, 408/484-9228, \$79.95. Free-form data manager is appealing but lacks some of the competition's features. *Nov 95, p. 87*
- ★★★ **InTouch 2.5**, Prairie Group, 515/225-3720, \$69.95. Free-form contact manager offers speedy access to information. *Sep 95, p. 69*
- ★★★ **Microsoft Works 4.0**, Microsoft, 206/882-8080, \$99.95. Good word processing and drawing tools; poor spreadsheet and database modules. *Jan 95, p. 63*
- ★★★★ **Now Up-to-Date and Contact 3.5**, Now Software, 503/274-2800, \$99. Calendar/address book combo features several enhancements. *Nov 95, p. 68*

PRESENTATION TOOLS

- ★★★★ **Adobe Premiere 4.0 (4.0.1)**, Adobe Systems, 415/961-4400, \$795. Advances far and above its competitors with professional-level features. *Dec 94, p. 54*
- ★★★★★/7.1 **Astound 2.0**, Gold Disk, 408/982-0200, \$249. Presentation graphics with a multimedia twist. *Mar 96, p. 73*
- ★★★★ **Authorware Professional 3.0**, Macromedia, 415/252-2000, \$4995. Multimedia authoring program is feature-packed but costly. *Dec 95, p. 66*
- ★★★ **CyberSound FX 1.0**, InVision Interactive, 415/812-7380, \$129. Plug-ins for Premiere make audio more polished, but access is cumbersome. *Nov 95, p. 91*
- ★★★ **HyperCard 2.3**, Apple Computer, 408/996-1010, \$129. Authoring tool is an inexpensive solution for multimedia developers. *Nov 95, p. 66*
- ★ **MediaFactory 1.0**, Nuts Technologies, 408/980-7800, \$199. Entry-level QuickTime movie editor

has an awkward interface. *Nov 95, p. 89*

- ★★/3.5 **Mediagnügen 1.0.1**, Gnügen Software, 303/682-5380, \$29.98. Almost useless as a serious browser; lets you view and copy collections of images, but not organize and sort them. *Apr 96, p. 67*
- ★★★★ **MediaPaint 1.0**, Strata, 801/628-5218, \$695. QuickTime paint program lets multimedia developers edit ranges of frames. *Sep 95, p. 56*
- ★★★ **Microsoft PowerPoint 4.0**, Microsoft, 206/882-8080, \$339. Presentation-graphics program is a good choice to use along with Word or Excel. *Feb 95, p. 67*
- ★★★★/6.5 **Movie Cleaner Pro 1.1.1**, Terran Interactive, 408/353-8859, \$129. QuickTime-compression utility produces crisp CD-ROM movies. *Apr 96, p. 69*
- ★★★★ **Persuasion 3.0**, Adobe Systems, 206/622-5500, \$495. Extensive charting options and hyper-text options are key additions. *Sep 94, p. 65*
- ★★/4.0 **ProView 1.1**, E-magine, 818/881-4757, \$69.95. Adequate tool for assembling an electronic portfolio or online manual. *Apr 96, p. 67*
- ★★/4.9 **STiP Professional 2.1**, MacVonk, 403/232-6545, \$1295. Multimedia authoring program is promising but flawed. *Apr 96, p. 75*
- ★★★★ **TransJammer**, Elastic Reality, 608/273-6585, \$99. Plug-in for Premiere and VideoShop offers 100 video-transition effects. *Aug 95, p. 83*

PROGRAMMING

- ★★★★ **AppWare 1.2**, Novell, 801/429-7000, \$495. Development system features an easy-to-use graphical programming method. *Oct 95, p. 68*
- ★★★★★/8.4 **CodeWarrior Gold 7**, Metrowerks, 512/305-0400, \$399. Key Power Mac compiler gets yet another face-lift. *Mar 96, p. 69*
- ★★★★ **FaceSpan 2.0**, Software Designs Unlimited, 214/578-6700, \$199. AppleScript interface builder lets developers create sophisticated applications. *Nov 95, p. 64*
- ★★★★ **JAM 6**, JYACC, 212/267-7722, \$2000. Development tools enable creation of large-scale corporate client-server databases. *Oct 95, p. 70*
- ★★★★★/8.0 **LS FORTRAN 1.1**, Fortner Research, 703/478-0181, \$695. FORTRAN rides again, running science programs on the Power Mac desktop. *Feb 96, p. 95*
- ★★★★★/7.0 **Roaster DR1**, Natural Intelligence, 617/876-4876, \$299. Java-for-Mac perks up the Web. *May 96, p. 53*
- ★★★ **Script Debugger 1.0**, Late Night Software, 604/929-5578, \$129. Script-development software improves on AppleScript, except in the debugging department. *Nov 95, p. 85*
- ★★★★★/8.4 **Scripter 1.0.1**, Main Event Software, 202/298-9595, \$199. AppleScript development system offers serious debugging power. *Mar 96, p. 88*
- ★★★ **Symantec C++ 8.0**, Symantec, 503/334-6054, \$499. Compiler has been improved and expanded but demands lots of resources. *Jul 95, p. 62*
- ★★★★★/7.0 **Tools Plus 2.6**, Water's Edge Software, 416/219-5628, For Symantec's C/C++ and Pascal \$149 each; for both \$199; for CodeWarrior Bronze \$199; for CodeWarrior Gold \$249. Programmers' tool kit saves time. *Feb 96, p. 92*

UTILITIES

- ★★★★★/7.3 **Adobe Fetch 1.2**, Adobe Systems, 415/961-4400, \$149. Catalog graphics, text, and more for easy organization and retrieval. *Apr 96, p. 102*

★★ **Adobe ScreenReady 1.0**, Adobe Systems, 415/961-4400, \$199. PostScript image rasterizer can aid multimedia developers but has some flaws. *Dec 95, p. 71*

★★★★/8.7 **Adobe Type Manager 3.9**, Adobe Systems, 415/961-4400, \$39.95. Accurately renders PostScript fonts at all sizes onscreen and on any printer. *Apr 96, p. 102*

★★★ **Aladdin Desktop Tools 1.0**, Aladdin Systems, 408/761-6200, \$89.95. Utilities collection is uneven but a worthwhile buy. *Aug 95, p. 69*

★★★★/7.3 **AliasZoo 2.0.5**, Blue Globe Software, shareware, \$15. Locates and fixes orphaned aliases and deletes unneeded ones. *Apr 96, p. 102*

★★★/6.9 **Anubis 2.54**, CharisMac Engineering, 916/885-4420, \$129.95. Disk formatter is reliable, easy to use. *May 96, p. 76*

★★★ **Arcserve for Macintosh 1.5**, Cheyenne Software, 516/484-5110, \$245 (5 users); \$495 (20 users). A good backup program for mixed-platform networks. *Jan 96, p. 63*

★★★★/9.3 **AreaCodeFinder 4.0**, John Calande, shareware, \$15. Identifies the location (and time zone) of a telephone area code and vice versa. *Apr 96, p. 102*

★★★/6.2 **At Ease 3.0**, Claris, 408/727-8227, \$46. This desktop alternative lets you share your Mac and worry less. *Feb 96, p. 81*

★★★★ **At Ease 3.0 for Workgroups**, Apple Computer, 408/996-1010, \$295. Desktop alternative is a handy tool for network administrators. *Nov 95, p. 83*

★★★★ **BeyondPress 1.0**, Astrobyte LC, 303/534-6344, \$595. QuarkXPress XTension is a great way to convert documents to Web pages. *Dec 95, p. 73*

★★★★/7.3 **Calc+ 2.0**, Abbott Systems, 914/747-4201, \$29. Simple calculator with a resizable, scrollable, editable, printable tape. *Apr 96, p. 102*

★★★★ **CD Directory 1.0**, Insignia Solutions, 415/694-7600, \$69.95. Utility stores catalogs of CD directories on a hard drive. *Jul 95, p. 73*

★★★/6.9 **Claris EMailer 1.0v2**, Claris, 408/987-7000, \$89. One-stop E-mail sending, receiving, and storing, plus a single all-encompassing address book. *Apr 96, p. 102*

★★★ **Color Compass 1.0**, Praxisoft, 703/729-3391, \$129. Speedy, specialized tools blend, match, and tweak colors. *Aug 95, p. 77*

★★★★/9.4 **Conflict Catcher 3.0.2**, Casady & Greene, 408/484-9228, \$99.95. Pretty near perfect, and pretty near essential, start-up file manager. *Apr 96, p. 102*

★★★★/7.6 **DeBabelizer 1.6.5**, Equilibrium Technologies, 415/332-4343, \$399. Endlessly talented and exasperating batch processor for bitmap graphics. *Apr 96, p. 102*

★★★★/8.6 **Desktop Dialer 1.4.2**, Sophisticated Circuits, 206/485-7979, \$75. Dials phone numbers appearing in any document. *Apr 96, p. 102*

★★★★/7.8 **DiskExpress II 2.20**, Alsoft, 713/353-4090, \$89.95. Intelligently defragments hard drives for optimum drive performance. *Apr 96, p. 102*

★★★/6.8 **DOS Mounter 95 1.0**, Software Architects, 206/487-0122, \$100. Windows-to-Mac file-transfer utility gets Win 95-savvy. *Mar 96, p. 74*

★★★★/8.1 **DragStrip 2.0**, Natural Intelligence, 617/876-7680, \$59.95. Feature-packed file launcher well worth the premium price. *Apr 96, p. 102*

★★★★/8.3 **Exodus 5.2.1**, White Pine Software, 603/886-9050, \$295. All around, the best for price/performance and X protocol support. *May 96, p. 108*. **Editors' Choice** for best X Window server software.

★★★ **File Genie Pro 1.1**, Duet Development, 408/559-3838, \$89. Disk- and file-management utility is fast but has limited search and sort criteria. *Oct 95, p. 87*

★★★★ **FolderBolt Pro 1.0.3**, Kent Marsh, 713/522-5625, \$129.95. Top-notch encryption schemes secure your Mac's contents. *Jul 95, p. 77*

★★★ **Gear 2.5**, Elektroson, 610/617-0850, \$799. CD-recordable mastering software is a mixed bag. *Sep 95, p. 91*

★★★/6.7 **GrabNet 2.0**, ForeFront Group, 713/961-1101, \$19.95. Bookmark manager for Netscape Navigator grabs Web graphics and text. *Apr 96, p. 102*

★★★ **Here & Now 1.0**, Software Architects, 206/487-0122, \$89.95. File-transfer utility facilitates putting a Mac disk in a PC. *Nov 95, p. 81*

★★★★ **InstantReplay 1.0**, Strata, 801/628-5218, \$149. Utility records on-screen activity and saves it as a QuickTime movie. *Sep 95, p. 89*

★★★★/7.6 **MacLinkPlus/Translators Pro 8.06ia**, DataViz, 203/268-0030, \$149. Excellent PC to Mac (or reverse) conversions for word processor, spreadsheet, or database documents. *Apr 96, p. 102*

★★★/4.5 **MacOpener 1.0**, DataViz, 203/268-0030, \$75. Unintuitive Mac-to-Windows file-transfer utility. *Mar 96, p. 75*

★★★/6.7 **MacX 1.5**, Apple Computer, 408/996-1010, \$295. X Window server software offers acceptable performance, but it's not the leader in the category. *May 96, p. 108*

★★★ **Menu Master Mac**, Electronic Learning Systems, 904/375-0558, \$99; 15-site license \$299. Security software is useful but could use some additional features. *Sep 95, p. 95*

★★★ **Multimedia Utilities 1.1**, Motion Tool Works, 415/541-9333, \$99.95. Six appealing utilities address QuickTime moviemaking but you should remember to save often. *Jul 95, p. 71*

★★★ **Norton Utilities for Macintosh 3.1**, Symantec, 503/334-6054, \$149.95. Utilities suite features strong disk repair and data recovery but weak backup. *Feb 95, p. 63*

★★★★/7.6 **Now Utilities 5.0.2**, Now Software, 503/274-2899, \$89.95. Diverse utilities collection with especially useful custom menu module. *Apr 96, p. 102*

★★★ **On Cue II Utilities 3.0**, ComputerEasy International, 602/829-9614, \$99.95. Eight utilities add functionality to the Mac Operating System. *Sep 95, p. 93*

★★★/5.1 **OneClick 1.0.1**, Westcode, 619/487-9200, \$129. Promising button-based macro utility needs fine-tuning. *May 96, p. 67*

★★★★/7.1 **OptiMem RAM Charger 2.12**, Jump Development Group, 412/681-2692, \$129. Increases RAM available for applications by allocating it more efficiently. *Apr 96, p. 102*

★★★★/8.3 **PopupFolder 2.0.1**, Inline Software, 617/938-8088, \$79. Improves Finder navigation via ubiquitous pop-up menus. *Apr 96, p. 102*

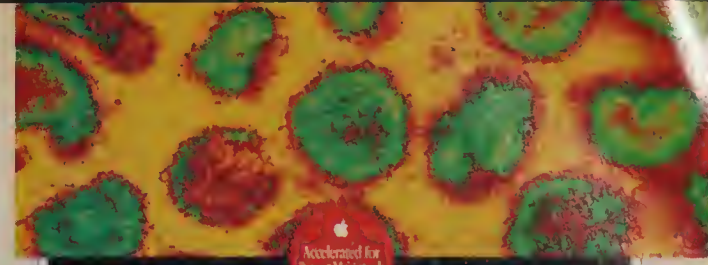
★★★★ **Power Secretary Power Edition 2.0**, Articulate Systems, 617/935-5656, \$2495. Speech-recognition program learns your voice patterns as you use it. *Sep 95, p. 60*

★★★★ **QuickKeys 3.0**, CE Software, 515/221-1801, \$139. Easy-to-use shortcut manager. *Mar 94, p. 61*

★★★★/8.6 **RAM Doubler 1.6**, Connectix, 415/571-5100, \$99. Fools your Mac into thinking it has twice the RAM it actually does. *Apr 96, p. 102*

★★★ **RapidCD 1.04**, Insignia Solutions, 415/694-7600, \$69.95. Utility provides speedy access to fre-

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Star Ratings

quently used data on CD-ROM. *Jul 95, p. 73*

- ★★★★/8.9 **Retrospect 3.0; Retrospect Remote 3.0**, Dantz Development, 510/253-3000, Retrospect \$249; Retrospect Remote (10 users) \$449. Backup programs now even more powerful, easier to use. *Apr 96, p. 61*
- ★★★★ **S/Link 2.0**, Synclavier, 603/448-8887, \$249. Utility is a valuable aid for anyone who does audio file conversion. *Nov 95, p. 91*
- ★★★★/8.4 **SCSI Director Pro 4.0**, Transoft, 805/897-3350, \$99.95. Hard disk formatting and testing utility. *Feb 96, p. 86*
- ★★★★/8.9 **Speed Doubler 1.0.2**, Connectix, 415/571-5100, \$99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56*
- ★★★★/7.9 **Stuffit Deluxe 3.5**, Aladdin Software, 408/761-6200, \$129.95. Mac, PC, and Internet file compression and decompression. *Apr 96, p. 102*
- ★★★★/8.9 **SuperATM 3.9**, Adobe Systems, 415/961-4400, \$69. ATM's PostScript font rendering plus intelligent substitution of missing fonts. *Apr 96, p. 102*
- ★★★★/7.2 **Transverter Pro 3.0.1**, TechPool Software, 216/291-1922, \$399. Batch-process PostScript files or preview them to catch mistakes before printing. *Apr 96, p. 102*
- ★★★★/7.5 **Typelt4Me 4.5.1**, Riccardo Ettore, shareware, \$30. Automatically expands user-defined abbreviations in any application. *Apr 96, p. 102*
- ★★★★/8.5 **TypeTamer 1.1.1**, Impossible Software, 714/470-4800, \$59.95. Every conceivable Font menu improvement in one well-designed program. *Apr 96, p. 102*
- ★★★ **ultraSecure 3.524**, usrEZ Software, 714/756-5140, \$239. Security program offers a comprehensive set of protection tools. *Sep 95, p. 81*
- ★★★★/6.5 **XoftWare for MacOS 3.0**, NetManage, 619/755-3998, \$295. X Window server software taken from Apple's MacX code, XoftWare turns in similar performance at a similar price. *May 96, p. 108*
- ★★★★/8.1 **XTen 6.0**, Tenon Intersystems, 805/963-6983, \$350. A speed demon, but be sure you're willing to be a Unix guru before choosing it. *May 96, p. 108*. **Editors' Choice** for best X Window server software.
- ★★★ **Zonkers 1.0**, Nova Development, 818/591-9600, \$19.95. Redecorate your Mac with a collection of silly desktop enhancements. *Aug 95, p. 89*

VERTICAL MARKETS

- ★★★★/8.1 **Finale 3.5.1**, Coda Music Technology, 612/937-9611, \$545. Music-notation software goes Power Mac native. *May 96, p. 81*
- ★★★★ **FreeStyle 1.01**, Mark of the Unicorn, 617/576-2760, \$200. Music sequencer with notation is a good choice for beginners. *Nov 95, p. 70*
- ★★★ **Insta Software**, Chang Labs, 408/727-8096, \$29 per module. No-frills relational databases handle forms and record-keeping for businesses. *Aug 95, p. 77*
- ★★★★ **Nightingale 2.0**, TAP Music Systems, 206/462-1007, \$495. Music-notation software is fast, feature-laden, and easy to learn. *Oct 95, p. 81*
- ★★★★/6.9 **Quicken Family Lawyer 6.0b**, Parsons Technology, 319/395-9626, \$49. Helps you prepare 61 legal documents. *Feb 96, p. 88*
- ★★★ **StoryBoard Artist 1.5**, PowerProduction Soft-

ware, 310/937-4411, \$499. Storyboard-creation software is useful but expensive. *Oct 95, p. 91*

- ★★ **Visual Arranger 1.0**, Yamaha Corp. of America, 714/522-9240, \$59.95. Song-building software is innovative, but replacing notation with icons doesn't work. *Nov 95, p. 89*

WRITING TOOLS

- ★★/3.0 **Indexicon 1.0**, Iconovex, 612/896-5100, \$129. Word 6 indexing tool has trouble identifying indexable terms. *Apr 96, p. 77*
- ★★★ **Microsoft Word 6.0 (6.0.1)**, Microsoft, 206/882-8080, \$339. Word processor's many new features may benefit users with fast Macs. *Feb 95, p. 53*. **Editors' Choice** for best high-end word processor. *Mar 95, p. 106*
- ★★★ **Nisus Writer 4.0**, Nisus Software, 619/481-1477, \$495. Word processor excels in specialized areas but has flawed table editor. *Mar 95, p. 53*
- ★★★★/7.1 **Spelling Coach Professional 4.1**, Deneba Software, 305/596-5644, \$69.95. Adds dictionary and thesaurus to almost any application. *Mar 96, p. 80*
- ★★★ **Three by Five 2.0**, MacToolkit, 310/395-4242, \$99. Idea organizer uses the metaphor of index cards on a corkboard. *Aug 95, p. 87*
- ★★★★/6.7 **WordPerfect 3.5**, Novell Business Applications, 801/225-5000, \$189. Popular word processor adds HTML editor. *Feb 96, p. 61*

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DESKTOP VIDEOCONFERENCING

- ★★★★/7.5 **Eris 1.0**, RSI Systems, 612/896-3020, \$3995. Dedicated box is easy to install, but the system is expensive and you need to supply your own camera. *May 96, p. 82*. **Editors' Choice** for best desktop video conferencing system.
- ★★★★/6.8 **Meet-Me 1.0**, Sat Sagem, 408/446-8690, \$2995. Good audio and video, but more expensive than the Apple system it's based on. *May 96, p. 82*
- ★★★★/7.1 **QuickTime Conferencing Kit 1.0**, Apple Computer, 408/996-1010, \$2000. Good value, straightforward LAN- and ISDN-capable software, but no digitizer included and ISDN setup is complex. *May 96, p. 82*
- ★★★★/6.5 **ShareVision Mac3000 1.0**, Creative Labs, 408/428-6600, \$1149. Easy to install with good sound quality, but small maximum frame size and poor synchronization are problems. *May 96, p. 82*
- ★★★★/5.2 **Visit Video 2.0 (2.1)**, Northern Telecom, 214/684-1000, \$2999. Good call management and supplies all hardware, but lacks H.320 support and has small on-screen frame size. *May 96, p. 82*

INPUT DEVICES

- ★★/4.7 **Adjustable Keyboard**, Apple Computer, 408/996-1010, \$119. Adjustable split keyboard, but with small function keys. *May 96, p. 98*
- ★★★★ **ArtZ II**, Wacom Technology, 360/750-8882, \$389.99. Graphics tablet has unique stylus that erases as well as draws. *Dec 95, p. 79*
- ★★★★/6.1 **BAT Personal Keyboard**, Infogrip, 805/652-0770, \$199. Chording device takes time to learn. *May 96, p. 98*
- ★★★ **ChoiceStick 1.0.2**, Kernel Productions, 302/456-3026, \$69.95. Port lets you attach a pair of joysticks to a Mac. *Sep 95, p. 85*

- ★★★★/6.0 **Comfort Keyboard**, Health Care Keyboard, 414/536-2160, \$795. Expensive keyboard has separate sections that adjust independently. *May 96, p. 98*
- ★★★★/5.8 **DataHand**, DataHand Systems, 602/860-8584, \$995. Costly, but requires much less arm and hand motion than other text-input devices. *May 96, p. 98*
- ★★★★/6.0 **Desktop GlidePoint**, Alps Electric, 408/432-6000, \$99.95. Average touchpad whose biggest selling points are adjustable base and edge-detection. *May 96, p. 98*
- ★★★★/6.0 **GlidePoint Desktop**, Cirque, 801/467-1100, \$99.95. Similar to Alps input device, but without detachable base. *May 96, p. 98*
- ★★★★/7.5 **Hitachi StudioPad**, Hitachi Digital Graphics, 408/747-0777, \$199.99. Graphics tablet for tight quarters. *Apr 96, p. 70*
- ★★ **Jetstick**, CH Products, 619/598-2518, \$74.95. Joystick's hardware is fine, but its manual and software are inadequate. *Sep 95, p. 95*
- ★★★ **MacAlly**, The Mace Group, 213/780-6110, \$49. ADB mouse doesn't stand out from the crowd, but is durable and affordable. *Jul 95, p. 75*
- ★★★★/5.2 **MacTrac Deluxe**, MicroSpeed, 510/490-1403, \$99. Good, basic trackball. *May 96, p. 98*
- ★★★★/5.6 **Microsoft Natural Keyboard**, Microsoft, 800/426-9400, \$99.95. Inexpensive split keyboard with integrated wrist rest. *May 96, p. 98*
- ★★★★/5.1 **Mouse Pen Mac 3.0**, Fellowes, 708/893-1600, \$39.99. Versatile, inexpensive penlike pointing device. *May 96, p. 98*
- ★★★★/6.2 **Mouse-Trak**, Itac Systems, 214/494-3073, \$179. Well-built trackball with good ball dynamics. *May 96, p. 98*. **Editors' Choice** for best input devices.
- ★★★★/5.0 **PenDirect ADB**, FTG Data Systems, 714/995-3900, \$398. PenDirect controls cursor on monitors, but with less precision than touch screen. *May 96, p. 98*
- ★★/4.4 **PointPad**, Hagiwara Sys-Com, 619/546-9989, \$89. Responds to direct pressure but awkward for dragging. *May 96, p. 98*
- ★★★★/7.0 **QuePoint II**, MicroQue, 801/263-1883, \$74.95. Excellent touchpad with customizable application settings. *May 96, p. 98*. **Editors' Choice** for best input devices.
- ★★★★/6.4 **RemotePoint**, Interlink Electronics, 805/484-1331, \$159.95. Wireless pointer works well for stand-up presentations. *May 96, p. 98*
- ★★★★/7.4 **Thinking Mouse 5.0**, Kensington Microware, 415/572-2700, \$89.99. Four-button mouse with excellent ergonomics and software. *May 96, p. 98*. **Editors' Choice** for best input devices.
- ★★/4.3 **TouchPad**, Touché Technologies, 415/331-6622, \$59.95. This touchpad suffers from small buttons that can't be customized. *May 96, p. 98*
- ★★★ **Trackball Pro ADB**, CH Products, 619/598-2518, \$119.95. Inexpensive trackball falls short in programmability and overall functionality. *Sep 95, p. 91*
- ★★★★/6.7 **Tru-Form**, Adesso, 213/294-4300, \$89 to \$99. Good split keyboard design with integrated pointing device. *May 96, p. 98*

MISCELLANEOUS HARDWARE

- ★★/4.0 **Brother MFC 4000ML**, Brother, 908/356-8880, \$1000 plus \$89 for Mac interface. Fax-copier-printer's top-notch fax features are marred by touchy printing. *May 96, p. 69*
- ★★★★/6.4 **Chinon ES-3000**, Chinon America, 310/

533-0274, \$1095. Digital camera zooms in but with the high price doesn't measure up to Kodak Digital Camera 40's. *Mar 96, p. 77*

★★★ **Kodak Digital Camera 40**, Eastman Kodak, 716/726-7260, \$995. Digital camera can use 37mm lens but has some flaws. *Jan 96, p. 59*

★★ **Smart Label Printer EZ30**, Seiko Instruments USA, 408/922-5800, \$199. Label printer's print quality and speed are disappointing. *Nov 95, p. 72*

★★★ **SoftBoard Model 205**, Microfield Graphics, 503/626-9393, \$2795. Electronic whiteboard is expensive but does the job. *Jan 96, p. 71*

★★★/5.9 **Sony PC Cam**, Sony Electronics, 941/731-4940, \$499. This desktop camera lacks AV strength; its competitor—VideoLabs' FlexCam—is simply the better camera. *Apr 96, p. 77*

MODEMS/NETWORK HARDWARE

★★★/6.9 **3Com Impact**, 3Com, 408/764-5000, \$549. This ISDN terminal adapter features easy-to-use installation software. *May 96, p. 54*

★★★★/7.7 **BitSurfr Pro**, Motorola, 205/430-8000, \$495. This ISDN terminal adapter offers a good value. *May 96, p. 54*

★★/4.6 **Courier I-Modem with ISDN/V.34**, U.S. Robotics, 847/676-7010, \$895. This ISDN terminal adapter is expensive and lacks features. *May 96, p. 54*

★★★ **GeoPort Telecom Adapter Kit**, Apple Computer, 408/996-1010, \$129.95. Adapter unlocks the capabilities of Apple's GeoPort modem. *Oct 95, p. 75*

★★★ **Internet Server Solution for WWW**, Apple Computer, 408/996-1010, \$2909. Web server is ideally suited for small-business sites. *Oct 95, p. 65*

★★ **Manta 500EN; Starfish Ethernet Access Point**, Digital Ocean, 913/888-3380, Manta \$799; Starfish \$1850. Wireless-communications package is capable but much too expensive. *Dec 95, p. 77*

★★★★ **OneWorld Combo**, Global Village Communication, 408/523-1000, \$1499 without modems; \$2099 with modems. Server is the very model of a multiuser modem pool. *Sep 95, p. 78*

★★★ **Power Class 28.8 Data/Fax Modem**, Motorola, 205/430-8000, \$395. Fax modem's hardware is superb, but it's hampered by mediocre software. *Oct 95, p. 89*

★★★/6.3 **QuickStream/3**, Sonic Systems, 408/736-1900, \$995; dial-out option \$249. Three-port remote-access server is priced right but has its limitations. *Apr 96, p. 62*

★★★★ **TelePort Platinum**, Global Village Communication, 408/523-1000, \$279. Reliable fax modem includes call recognition. *Aug 95, p. 81*

★★★★/8.2 **TribeLink2**, Tribe Computer Works, 510/814-3900, \$1295; dial-out option \$200; additional PPP client licenses \$145 for 10 users to \$1495 for 500. Two-port remote-access server features Web-based administration. *Apr 96, p. 62*

PRINTERS

★★★★ **Apple Color StyleWriter 2200**, Apple Computer, 408/996-1010, \$419. Portable ink-jet printer is ideal for color output when you're on the road. *Nov 95, p. 66*

★★★★/7.0 **Apple Color StyleWriter 2200**, Apple Computer, 408/996-1010, \$419. The (almost) perfect printing companion for your PowerBook. *Apr 96, p. 133*

★★★★/7.2 **Apple Color StyleWriter 2400**, Apple Computer, 408/996-1010, \$429. Very good print

quality at a reasonable price. *Apr 96, p. 133*. **Editors' Choice** for best midrange color ink-jet printers.

★★★/6.2 **Canon BJC-210**, Canon Computer Systems, 714/438-3000, \$299. This color ink-jet has a small footprint and low price but is only an average performer. *Apr 96, p. 133*

★★★★/7.1 **Canon BJC-4100**, Canon Computer Systems, 714/438-3000, \$399. Excellent print quality and can be used with a PC. *Apr 96, p. 133*. **Editors' Choice** for best midrange color ink-jet printers.

★★★★/7.2 **Epson Stylus Pro**, Epson America, 310/782-0770, \$999. Top-notch 720-dpi output, sprightly performance; a bargain alternative to dye-sub printers. *Apr 96, p. 133*. **Editors' Choice** for best high-end color ink-jet printers.

★★★★ **Fargo FotoFun**, Fargo Electronics, 612/941-9470, \$399.95. Dye-sublimation printer produces good output at a reasonable price. *Jan 96, p. 61*

★★★/5.4 **HP CopyJet M**, Hewlett-Packard, 800/752-0900, \$3649. Color copier and ink-jet printer in a single unit. *Feb 96, p. 77*

★★★/6.3 **HP DeskWriter 660C**, Hewlett-Packard, 208/323-2551, \$499. Poor color accuracy, blocky text and slow print speeds; easily networked. *Apr 96, p. 133*

★★★★ **HP LaserJet 5MP**, Hewlett-Packard, 800/752-0900, \$1299. Laser printer meets the high demands of small businesses and home offices. *Jul 95, p. 58*

★★★★ **LaserWriter 4/600 PS**, Apple Computer, 408/996-1010, \$929. Compact printer produces great-looking 600-dpi output. *Dec 95, p. 60*

★★ **Nikon Coolprint**, Nikon Electronic Imaging, 516/547-4355, \$2350. Color dye-sublimation printer is fast, but print quality is flawed. *Sep 95, p. 83*

★★★ **Pictura 310**, Fargo Electronics, 612/941-9470, \$4995; optional Adobe Level 2 PostScript package \$795. Printer produces acceptable print quality, but its color-matching capabilities are substandard. *Jul 95, p. 61*. **Editors' Choice** for best low-end dye-sublimation printer. *Jan 96, p. 94*

★★★★ **StyleWriter 1200**, Apple Computer, 408/996-1010, \$269. The newest model of Apple's ink-jet printer offers improved print quality. *Sep 95, p. 65*

★★★ **Typhoon 8**, Dataproducts, 818/887-8000, \$3100 (600 dpi, 4M8 of RAM); \$5199 (1200 dpi, 36M8 of RAM). Workgroup printer offers top-notch 1200-dpi output but is a bit pricey. *Dec 95, p. 64*

★★ **Xerox 4510ps**, Xerox, 800/349-3769, \$1745. Printer has neither the performance nor the quality to justify its price. *Dec 95, p. 68*

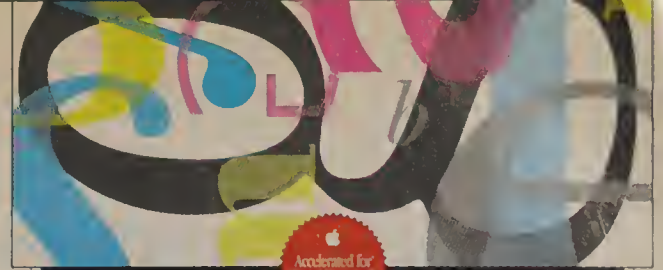
SCANNERS

★★/3.3 **ArtiScan Z1-600**, Tamarack, 714/744-3979, \$649. The ArtiScan Z1-600's poor software, manual, and scanning performance make it hard for us to recommend it, even at its low price. So we won't. *Mar 96, p. 118*

★★/3.7 **Biz Card Manager**, Electronic Document Technology, 408/733-7309, \$369. Fast card scanner but more expensive, no automatic scanning or data transfer to contact managers, and makes errors. *Apr 96, p. 64*

★★/3.7 **Biz Card Reader**, Umax Technologies, 510/651-8883, \$245. Exports automatically scanned data to contact managers but uses a non-standard SCSI connector and has no on/off switch. *Apr 96, p. 64*

★★/3.3 **Color OneScanner**, Apple Computer, 408/996-1010, \$859. The Color OneScanner's anemic *continues*



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Star Ratings

software bundle and lackluster performance would make it an unexceptional offer even if reasonably priced. *Mar 96, p. 118*

- ★★★/3.1 **CS-300**, Ricoh, 408/954-5326, \$599. The CS-300 scanner has one thing going for it: it's dirt cheap. Unfortunately, with performance, software, and documentation this weak, it's still overpriced. *Mar 96, p. 118*
- ★ **Digital Fotovix IIIS-D**, Tamron Industries, 516/484-8880, \$2299. Video slide scanner's image quality doesn't measure up to the competition. *Jan 96, p. 67*
- ★★★★/5.4 **EasyPhoto Reader**, Storm Software, 415/691-6600, \$259. Small-format photo scanner has its limits. *May 96, p. 66*
- ★★★★/7.2 **ES-1200C**, Epson, 310/782-0770, \$1299. The ES-1200C scanner has great image quality, respectable speed, and good software, all at a reasonable price. *Mar 96, p. 118*. **Editors' Choice** for best midrange scanners.
- ★★★ **Fujitsu ScanPartner Jr.**, Fujitsu Computer Products of America, 408/432-6333, \$499. Compact scanner with good OCR software is an economical scanning solution. *Jul 95, p. 63*
- ★★★★/7.1 **Gemini D-16**, Umax, 510/651-4000, \$1895-\$1995. The Gemini D-16 is unique in being both a 400-dpi and 800-dpi scanner, depending on the scanning area. But for several hundred dollars above its competitors, you'd better need that extra resolution. *Mar 96, p. 118*
- ★★★★ **HP ScanJet 3c**, Hewlett-Packard, 208/323-2551, \$1179. Economical scanner offers a broad tonal range and accurate colors. *Oct 95, p. 79*
- ★★★★/6.1 **HP ScanJet 4c**, Hewlett-Packard, 208/396-2551, \$1175. The HP ScanJet 4c is a respectable performer in all categories, though not exceptional. Limited software is its greatest weakness. *Mar 96, p. 118*
- ★★★/3.8 **IX-4015**, Canon, 714/438-3000, \$799. Boasts desk-space economy and an exceptional warranty, but its performance and software bundle are mediocre. *Mar 96, p. 118*
- ★★★★/6.9 **Mac IRISPen**, Image Recognition Integrated Systems, 407/395-7831, \$299. Portable, accurate pen OCR scanner. *Apr 96, p. 75*
- ★★★★★/9.6 **PaperPort Vx**, Visioneer, 415/493-9599, \$369. Desktop document scanner just gets better. *Mar 96, p. 82*
- ★★★/4.0 **Paragon 1200SP**, Mustek, 714/250-8855, \$899 to \$1000. The Paragon 1200SP is a disappointment, from its performance to its bare-bones manual. Proof that a 600-dpi, 30-bit scanner for \$899 isn't a bargain. *Mar 96, p. 118*
- ★★★★/5.0 **ScanMaker IIs**, Microtek, 310/297-5000, \$499-\$699 (street). The ScanMaker IIs is a shaky performer at best, especially when it comes to capturing highlight detail (it doesn't), but it's an option for the bargain hunter. *Mar 96, p. 118*
- ★★★★/5.8 **ScanTouch AX-1200**, Nikon, 516/547-4355, \$1720. The ScanTouch AX-1200 is a solid performer, but at this price it should be closer to stunning. *Mar 96, p. 118*
- ★★★★/5.6 **SilverScanner III**, La Cie, 503/520-9000, \$1499-\$1699. The SilverScanner III is a good performer in many respects, but its poor color accuracy and high price place it behind the Epson ES-1200C on which it's based. *Mar 96, p. 118*
- ★★★★/5.9 **StudioScan IIsi**, Agfa, 508/658-5600,

\$900 (street). The StudioScan IIsi gets good performance from its 30-bit, 400-dpi engine. Agfa's software is powerful and flexible, but could be easier to use. *Mar 96, p. 118*

- ★★★/3.8 **VIP Scan**, La Cie, 503/520-9000, \$199. Scans automatically to contact manager, includes Now Contact; uses nonstandard SCSI connector. *Apr 96, p. 64*
- ★★★ **Vista-S8**, Umax Technologies, 510/651-8883, \$995 (LE+); \$1095 (Pro+). 24-bit color flatbed scanner has a lot of useful features for its low price. *Jul 95, p. 67*

SPEAKERS

- ★★★★/8.8 **Acoustimass**, Bose, 508/879-7330, \$699. Full, rich, natural sound; treble slightly rolled off but clean. *Mar 96, p. 157*. **Editors' Choice** for best three-piece speakers.
- ★★★★/7.1 **ACS 52**, Altec Lansing, 717/296-2818, \$128. Clean, reasonably solid presentation; crisp highs; powerful bass for such a small design. *Mar 96, p. 157*
- ★★★★/7.1 **AMX-16**, Radio Shack, 817/390-3300, \$120 (street). Clean, reasonably crisp, slightly bright, decent bass, somewhat lacking in low-end heft. *Mar 96, p. 157*
- ★★★/6.8 **AppleDesign Powered Speakers**, Apple Computer, 408/996-1010, \$179. Clean, reasonably solid presentation. Bass is good but doesn't shake the foundations. *Mar 96, p. 157*
- ★★★/4.9 **AV270 Powered Speakers**, Advent, 708/317-3700, \$179. Clean and smooth, with somewhat tinny quality to midrange and highs. *Mar 96, p. 157*
- ★★★/6.2 **AV622 Powered Speakers**, Advent, 708/317-3700, \$299. Clean and smooth, with somewhat lightweight character. Slight treble emphasis. Bass has reasonable weight and impact. *Mar 96, p. 157*
- ★★★★ **DayStar PowerPro 601/DayStar Turbo 601**, DayStar Digital, 404/967-2077, PowerPro 601 \$1599; Turbo 601 \$1499. Impressive 601-based accelerator cards squeeze more performance out of Macs. *Sep 95, p. 67*
- ★★★★/5.2 **J-688AV**, Jazz, 818/336-2689, \$149. Reasonably smooth sound, noticeably rolled-off high end, slightly harsh midrange becomes a bit fatiguing over a long listening session. *Mar 96, p. 157*
- ★★★/4.7 **J-902**, Jazz, 818/336-2689, \$150. Clear reproduction, with moderate bass emphasis and overemphasized treble. Generally thin sonic character because of the high-frequency emphasis. *Mar 96, p. 157*
- ★★★/5.8 **JPS 45**, Jensen, 708/317-3700, \$149. Clean, reasonably crisp, slightly bright; an almost sandpapery affect on cymbals; adequate bass, but somewhat lacking in low-end heft. *Mar 96, p. 157*
- ★★★/3.5 **Labtec LCS-3210**, Labtec, 360/896-2000, \$119 (street). Decent, slightly boomy bass, harsh midrange, rolled-off treble. Sound gets harsher when played at loud volumes. *Mar 96, p. 157*
- ★★★★/6.2 **MA-12CP**, Roland, 213/685-5141, \$319. Relatively warm, well-balanced sound; slightly lightweight bass. Tends to sound harsh when played at normal volume levels. *Mar 96, p. 157*
- ★★★★/7.8 **MediaMate**, Bose, 508/879-7330, \$339. Full, warm, rich, natural sound. Cymbals had considerable clarity and detail and sounded realistic. Amazingly robust for such a small speaker. *Mar 96, p. 157*. **Editors' Choice** for best desktop speakers.
- ★★★/6.6 **MLi-95**, Midi Land, 909/592-1168, \$120.

Surprisingly good sound for the money. Clean, reasonably clear; fine musical details a wee bit indistinct, good voice reproduction, adequate bass. Smooth highs, accurate presentation. *Mar 96, p. 157*

- ★★★★/7.5 **MMS 557**, Audio-Technica, 216/686-2600, \$150. Relatively clean, slightly bright, crisp sound. Surprisingly robust bass for a small box. *Mar 96, p. 157*
- ★★★★/7.9 **SoundWorks**, Cambridge SoundWorks, 617/332-5936, \$220. Clean, well-balanced sound, slight upper midrange emphasis, good bass. *Mar 96, p. 157*. **Editors' Choice** for best three-piece speakers.
- ★★★/5.7 **SurroundSound ACS 500**, Altec Lansing, 717/296-2818, \$450. Robust sound, slightly smeared highs, and slight harshness when played at loud volume. Bass is powerful, but a bit boomy. *Mar 96, p. 157*
- ★★★/3.7 **SW150**, Koss, 414/964-5000, \$180. Weak bass, harsh midrange, rolled-off treble. No saving graces. *Mar 96, p. 157*
- ★★★/6.4 **TC1490-7SUB**, Multimedia Labs, 410/429-4300, \$249. Clean sound and thin balance; adjusting subwoofer output just makes bass boom, but bass is always lightweight. *Mar 96, p. 157*
- ★★★ **Vivid 3D Pro**, NuReality, 714/442-1080, \$149.95. Sound-enhancement system produces 3-D sound from a pair of speakers. *Aug 95, p. 87*
- ★★★/6.4 **YST-SS1010**, Yamaha, 714/522-9240, \$350. Relatively warm, well-balanced sound, slightly rolled-off treble with slight smearing effect on cymbals, average bass impact with subwoofer. Tends to sound harsh when played at loud volume levels. *Mar 96, p. 157*

SYSTEMS/STORAGE

- ★★★ **Envoy Wireless Communicator**, Motorola, 800/894-7353, \$1000 to \$1500. Magic Cap-based PDA was our reviewers' first choice for E-mail. *Aug 95, p. 62*
- ★★★★ **EZ135**, SyQuest Technology, 510/226-4000, \$249. Removable drive is fast and comes with a fine selection of bundled software. *Dec 95, p. 58*
- ★★★ **Marco Wireless Communicator**, Motorola, 800/894-7353, \$900 to \$1400. Newton OS-based PDA includes a radio modem. *Aug 95, p. 62*
- ★★★ **Master CD Pro**, MicroNet Technology, 714/453-6000, \$4995. Recordable CD-ROM drive is a good tool for professional CD production. *Aug 95, p. 83*
- ★★★★/7.5 **MessagePad 120 with Newton OS 2.0**, Apple Computer, 408/996-1010, \$699. If the first Newton had been this good, you'd already have one. *Mar 96, p. 57*
- ★★★/5.6 **Performa 5125CD**, Apple Computer, 408/996-1010, \$2300. The all-in-one design is appealing, but the performance is just so-so. *Feb 96, p. 96*
- ★★★★/7.1 **Power 100**, Power Computing, 512/258-1350, \$1699. Powerful and inexpensive, the Power 100 comes bundled with all the extras you'd want. *Feb 96, p. 96*. **Editors' Choice** for best home- and small-office Mac.
- ★★★★/7.4 **Power 120**, Power Computing, 512/258-1350, \$1999. Like its Power 100 sibling, this system offers strong performance at a good price. *Feb 96, p. 96*
- ★★★★/5.8 **PowerBook 5300**, Apple Computer, 408/996-1010, \$2300. A gray-scale screen and middling performance make this just an acceptable notebook. *Feb 96, p. 96*
- ★★★/5.9 **PowerBook 5300c**, Apple Computer,

408/996-1010, \$4500. A great color screen and strong expandability balance with so-so performance. *Feb 96, p. 58.* **Editors' Choice** for best portable Mac. *Feb 96, p. 96*

★★★/5.9 **PowerBook 5300cs**, Apple Computer, 408/996-1010, \$3600. Good expansion, so-so speed, and a decent color screen make this fine for short-term use. *Feb 96, p. 96*

★★★/5.9 **PowerBook Duo 2300c**, Apple Computer, 408/996-1010, \$3699 (8MB of RAM, 750MB hard drive); \$4699 (20MB of RAM, 1.1GB hard drive, 14.4-Kbps fax modem). This new Duo packs a lot of power into a little package. *Apr 96, p. 58*

★★★★/7.5 **PowerCurve 601/120**, Power Computing, 512/388-6868, base model \$1849. Apple's Power Mac 7500 has a new rival; the PowerCurve 601/120 offers excellent speed at a competitive price. *Apr 96, p. 57*

★★★/6.5 **Power Macintosh 7200/75**, Apple Computer, 408/996-1010, \$1600. A dumbed-down version of the 7500, this system offers just the basics. *Feb 96, p. 96*

★★★★/7.8 **Power Macintosh 7500/100**, Apple Computer, 408/996-1010, \$3100. Powerful and relatively inexpensive, the Power Mac 7500/100 shines in its easy-to-upgrade design. *Feb 96, p. 96.* **Editors' Choice** for best business-and-professional Mac.

★★★★/7.7 **Power Macintosh 8500/120**, Apple Computer, 408/996-1010, \$4200. The 8500's 604 CPU and bundled cache give it good performance. *Feb 96, p. 96.* **Editors' Choice** for best publishing and graphics Mac and best media-authoring Mac.

★★★ **Power Macintosh 9500/132**, Apple Computer, 408/996-1010, \$5799. Power Mac offers speed, expansion, and lots of memory. *Oct 95, p. 60*

★★★★/7.6 **PowerWave 604/120**, Power Computing, 512/258-1350, \$3199. Power Computing has made the 604 CPU available at 601-based systems' prices. *Feb 96, p. 54.* **Editors' Choice** for best business-and-professional Mac. *Feb 96, p. 96*

★★★★/7.6 **PowerWave 604/132**, Power Computing, 512/258-1350, \$3699 (256K cache card included). This fast, sensibly priced system bundled with bonus software is a great value. *Feb 96, p. 54*

★★★★/7.7 **PowerWave 604/150**, Power Computing, 512/258-1350, \$4499 (512K cache card included). The fastest Mac currently available, the price is not quite as attractive as for other PowerWave models. *Feb 96, p. 54*

★★★★/8.1 **PR2-16828W**, ProMax Technology, 714/727-3977, \$8890. PCI disk array has comparatively low price and can repartition with reconfiguring hardware, but has confusing installation guide for drives. *May 96, p. 57*

★★★/5.1 **SCSI PowerPlug II**, Hot Wire Technology, 203/761-0651, \$119.99. A fast way to swap SCSI devices. *Feb 96, p. 86*

★★★/6.5 **SledgeHammer 3500FMF PCI II**, FWB, 415/325-4392, \$5129. PCI disk array's software is easy to use, but cables are sometimes difficult to attach. *May 96, p. 57*

★★★/6.9 **SledgeHammer 7000FMF PCI II**, FWB, 415/325-4392, \$9439. Fastest PCI disk array tested, but cables are sometimes difficult to attach. *May 96, p. 57*

★★★ **SledgeHammer8000FT**, FWB, 415/325-4392, \$23,599. Level 5 RAID array provides constant access to your stored information. *Sep 95, p. 59*

★★★ **Sony Magic Link**, Sony, 800/571-7669, \$699.95. Using this PDA is a breeze, but it lacks applications. *Aug 95, p. 62*

★★★/5.8 **System 100**, Radius, 408/541-6100, \$10,500. Radius bundles its mediocre digital-video

cards on a relabeled Power Mac 8100—that's no wise investment. *Feb 96, p. 96*

★★★★ **Zip Drive**, Iomega, 801/778-1000, \$199.95; 100MB cartridge \$19.95. External drive combines speedy performance, convenience, and economy. *Jul 95, p. 59*

VIDEO/DISPLAY

★★/4.2 **AlphaScan GLX**, Sampo Technology, 770/449-6220, \$1495. Low price fails to outweigh poor image quality. *Feb 96, p. 165*

★★/3.3 **Datashow AV 4500**, Sayett Technology, 716/624-1290, \$4875. Panel has inscrutable menus; lackluster video performance. *May 96, p. 139*

★★★/5.5 **Diamond Pro 21TX**, Mitsubishi Electronics America, 714/220-2500, \$2199. Washed-out colors hold back an otherwise strong contender. *Feb 96, p. 165*

★★★ **EAsycolor 24/1360**, EA Research, 510/867-0967, \$1699. Video board offers Photoshop CMYK acceleration and multisync monitor support. *Aug 95, p. 64*

★★★ **Encoder Pro**, P2 Systems, 206/525-2081, \$259. Inexpensive Mac-to-TV adapter is a good value. *Jan 96, p. 69*

★★/4.4 **FlexScan F2 21**, Nanao, 310/325-5202, \$2299. Blurry, dim image and too high a price. *Feb 96, p. 165*

★★★★/7.1 **MagnaByte M3xv**, Telex, 612/884-4051, \$3995. Easy-to-use projection panel, with good image quality, midrange price. *May 96, p. 139.* **Editors' Choice** for best LCD projection panels.

★★★/5.2 **MagniView 488B**, Dukane Audiovisual Products, 708/584-2300, \$4995. LCD panel's image quality is a notch below average in all categories. *May 96, p. 139*

★★/4.8 **Multigraph 445X**, Nokia Display Products, 415/943-4071, \$2775. Adequate image quality, but at too high a price. *Feb 96, p. 165*

★★★/6.2 **Multiple Scan 20 Display**, Apple Computer, 408/996-1010, \$2149. Not as vibrant as it could be, but good value. *Feb 96, p. 165*

★★★/5.9 **MultiscanTC**, Sony, 408/432-0190, \$3950. Special color-adjustment tools don't overcome mediocre performance. *Feb 96, p. 165*

★★★★/7.3 **MultiSync XE21**, NEC Technologies, 508/264-8000, \$1899. Rich, bright images complemented by excellent controls. *Feb 96, p. 165*

★★★/5.8 **MultiView 21**, Radius, 408/541-5700, \$2149. Seductively rich colors, but too soft a focus. *Feb 96, p. 165*

★★★/5.0 **Ovation 810**, Proxima, 619/457-5500, \$3295. A better value than Proxima's high-end Ovation 846C panel. *May 96, p. 139*

★★/4.7 **Ovation 846C**, Proxima, 619/457-5500, \$5995. Design and features outshine image quality of this projection panel. *May 96, p. 139*

★★★ **PaintBoard Prism GT**, RasterOps, 408/562-4200, \$999. Video board offers good QuickDraw acceleration but no Photoshop acceleration. *Aug 95, p. 64*

★★★/5.0 **PanaSync/Pro C2192P**, Panasonic Communications & Systems, 201/348-7000, \$1999. Reasonable price fails to overcome weak image quality. *Feb 96, p. 165*

★★★/6.6 **Pivot 1700**, Portrait Display Labs, 510/227-2700, \$1099. Good image quality but doesn't automatically switch views when rotated. *Mar 96, p. 70*

★★★/5.4 **Polaview 3000**, Polaroid Electronic Imaging Systems, 617/386-2000, \$5295. Panel has unre-

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Star Ratings

markable overall image quality, but above-average video. May 96, p. 139

★★/3.5 **PowerView 950V**, In Focus Systems, 503/685-8888, \$9499. Innovative concepts but substandard image quality; overpriced. May 96, p. 139

★★★★ **Presenter TView**, TView, 503/643-1662, \$449. Reliable Mac-to-TV adapter produces an excellent picture. Jan 96, p. 69

★★★★/8.6 **PressView 21 SR**, Radius, 408/541-6100, \$3999. The best professional-quality display gets better. Feb 96, p. 62

★★/4.3 **ProColor 1701**, Boxlight, 360/779-7901, \$6499. Panel has substandard image quality and hard-to-use controls. May 96, p. 139

★★★★/5.0 **QuickDraw 3D Accelerator Card**, Apple Computer, 408/996-1010, \$400. Supports texture maps but only minor speed gains with major 3-D applications. Apr 96, p. 60

★★★ **QuickTake 150**, Apple Computer, 408/996-1010, \$739. Digital camera is easy to use and includes close-up lens. Jan 96, p. 59

★★ **Radius Telecast**, Radius, 408/541-6100, \$9995. QuickTime-based video editor has potential, but software is not yet mature. Jan 96, p. 65

★★★★/7.2 **Rainbow 30/10**, Chisholm, 408/559-1111, \$4995. Panel is carefully designed for ease of use; a good value. May 96, p. 139. **Editors' Choice** for best LCD projection panels.

★★★★/7.3 **RasterOps SuperScan Mc 21**, NSA/Hitachi, 617/461-8300, \$2299. Top performance plus sensible, intuitive controls create a winning combination. Feb 96, p. 165. **Editors' Choice** for best two-page monitor.

★★/4.0 **Sharp QA-2500**, Sharp, 201/529-8731, \$9995. Panel offers overly complex image controls; expensive. May 96, p. 139

★★★★/5.5 **SmartMaster 3600**, In Focus Systems, 503/685-8888, \$3799. A solid LCD performer and a good value. May 96, p. 139

★★/4.1 **SyncMaster 20GLs**, Samsung Electronics America, 201/691-6200, \$1599. Glare-catching, image-distorting tube; weak controls. Feb 96, p. 165

★★★★ **Targa 2000 1.2**, Truevision, 408/562-4200, \$5495. Video board offers good picture quality and fully synced 16-bit audio. Dec 95, p. 71

★★★★ **Thunder IV GX 1360**, Radius, 408/541-6100, \$2999. Video board provides impressive QuickDraw and Photoshop acceleration. Aug 95, p. 64


★★★★/5.8 **ViewSonic 21PS**, ViewSonic, 909/869-7976, \$2095. Bright, vibrant, though not particularly sharp image. Feb 96, p. 165

★★★★/5.3 **VisionMaster Pro 21**, Iiyama North America, 215/957-6543, \$1995. Good image quality, but confusing controls. Feb 96, p. 165

★★★★/5.9 **Vision Q3 LCD Panel**, Apollo Presentation Products, 516/467-8033, \$6750. Top image quality but difficult to use. May 96, p. 139

★★★★/5.0 **VR-1000 3-D Stereoscopic LCD Projection Panel**, VRex, 914/345-8877, \$6995. The only choice for projecting 3-D images, though stereo 3-D images don't integrate well with standard PowerPoint or Persuasion slide shows. May 96, p. 139

★/1.9 **Yarc Screamer**, Yarc Systems, 805/499-9444, \$995. Supports texture maps but slower than using no board in some instances. Apr 96, p. 60

★★★★/5.6 **Z215**, nView, 804/873-1354, \$5695. LCD panel has good image quality, is very sleek and compact. May 96, p. 139 

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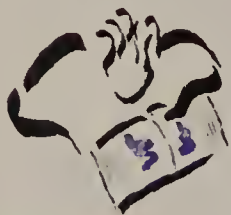
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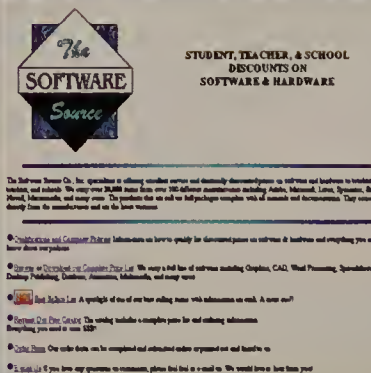
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Macworld

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Which of the following computers have you purchased within the last three years?

- ☐ 1. Apple Workgroup Servers, Mac Quadra-series, Centris-series, II-series, Power Mac-series
- ☐ 2. Mac Classic-series, LC-series
- ☐ 3. Mac Performa-series
- ☐ 4. Mac PowerBook-series, Duo-series
- ☐ 5. Other Macs (SE, SE/30, Plus, 512K, etc.)
- ☐ 6. None above.

Do you recommend, buy, specify or approve microcomputer software and/or peripherals?

- ☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement.

- ☐ 1. 1-3 ☐ 5. 50-99
- ☐ 2. 4-9 ☐ 6. 100-499
- ☐ 3. 10-19 ☐ 7. 500+
- ☐ 4. 20-49

Do you use a Macintosh at:

- ☐ 1. Business, government
- ☐ 2. Home: for education or entertainment
- ☐ 3. Home: for work at home
- ☐ 4. Home office
- ☐ 5. Educational institution
- ☐ 6. None above

Which of the following describes your occupation/department function?

- ☐ 1. Graphic arts, design, architecture
- ☐ 2. General office/administration, management, personnel, purchasing
- ☐ 3. Consulting
- ☐ 4. Education, training
- ☐ 5. Engineering/R&D
- ☐ 6. Sales, marketing, advertising, communications
- ☐ 7. MIS/DP
- ☐ 8. Programming/software development
- ☐ 9. Does not apply
- ☐ 10. Other (specify below)

What is the primary business of your company/institution?

- ☐ 1. Graphics
- ☐ 2. Aerospace
- ☐ 3. Business consultant
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. VAR/VAD/retail/whole-sale (computer specific)
- ☐ 7. Engineering
- ☐ 8. Marketing, advertising, PR
- ☐ 9. Printing/publishing
- ☐ 10. Does not apply
- ☐ 11. Other (specify below)

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Highest Possible Rating



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- ▲ ScanPrep
- ▲ Omnipage Lite OCR

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SilverScanner PRO with Photoshop LE

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interpolated up to 1200 dpi.

- ▲ Photoshop LE
- ▲ ScanPrep
- ▲ SilverScan
- ▲ Omnipage Lite OCR

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- ▲ SilverScan
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

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SilverScanner DTP with Photoshop LE

30 bit color, 400 x 800 dpi
interpolated up to 3200 dpi.

- ▲ Photoshop LE
- ▲ ScanPrep
- ▲ SilverScan
- ▲ Omnipage Lite OCR

\$889

SilverScanner III

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interpolated up to 4800 dpi.

- ▲ SilverScan
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

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SilverScanner III with Photoshop Full

30 bit color, 600 x 1200 dpi
interpolated up to 4800 dpi.

- ▲ Photoshop (Full Edition)
- ▲ ScanPrep
- ▲ SilverScan
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ScanPrep yields professional prepress results, quickly and easily.

ScanPrep provides automatic adjustment of picture contrast and color saturation. Even when the original is lacking in contrast or saturation, it corrects the problem without human intervention.

ScanPrep
Smart Agent
Image Processor

OUTPUT

Desired Result: **Full Range Separation**

Printing Process: **Brochure (Sheet Fed)**

Paper Stock: **Coated**

Range/Gain: **3/95/4**

Screen Preference: **150**

INPUT

Source: **La Cie SilverScanner III**

Original: **Color Photo**

Appearance: **Normal**

Condition: **Normal**

Input Width: **6.25** inches

Input Height: **5** inches

Output Width: **6.25** inches

Output Height: **5** inches

Scale: **100** %

Current Settings: - Untitled -

Load... **Save...** **Cancel** **OK**



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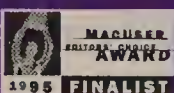
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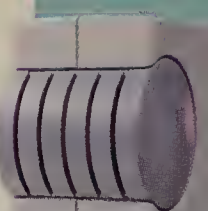
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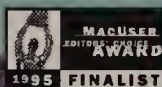
\$339

Quantum 1280 MB

850MB Quantum Trailblazer	4500 rpm	3 yr. warr.	\$259
1080MB Quantum Fireball	5400 rpm	3 yr. warr.	\$329
1280MB Quantum Fireball	5400 rpm	3 yr. warr.	\$339
2160MB Ultrastar ES IBM	5400 rpm	5 yr. warr.	\$589
4.3GB Quantum Atlas	7200 rpm	5 yr. warr.	\$999

- ▲ Ready to plug and play with switchable active termination, cables, and La Cie Storage Utilities.
- ▲ High-speed drive and disk-controller technology.
- ▲ Up to 4.3GB capacity in a 6.5"x8.5"x2.2" compact case.

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- ▲ Shore hard disk-sized files with diskette convenience.
- ▲ Unplug and go for convenient data transport.

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Special **LOW** Price

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Quantum Atlas 4.3 GB

3.5" Drives

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1080MB Quantum Fireball	5400 rpm	3 yr. warr.	\$249
1280MB Quantum Fireball	5400 rpm	3 yr. warr.	\$269
2160MB IBM Ultrastar ES	5400 rpm	5 yr. warr.	\$489
4.3GB Quantum Atlas	7200 rpm	5 yr. warr.	\$888

Brackets available for \$10 with internal hard drive purchase.



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For use in Tower with a Joule Base.

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8.0GB TURBO DAT DDS-2	Includes Retrospect	\$1159
230MB Optical	1 yr. warr.	\$529

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2160MB IBM Ultrastar ES Hard Drive	3 yr. warr.	\$699
230MB Optical	1 yr. warr.	\$529

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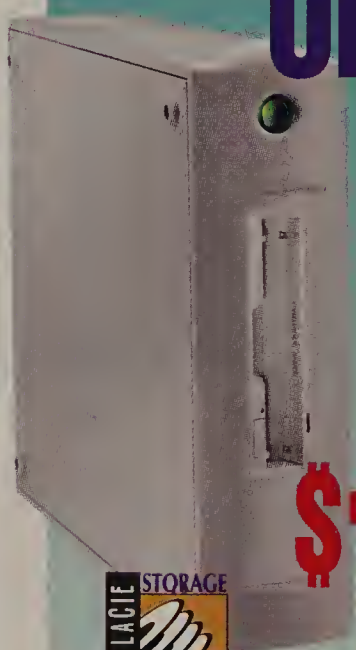
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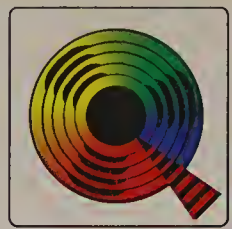
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ClubMac 5.25"
200MB
Removable



FEATURING



5198 2001

\$197

135MB



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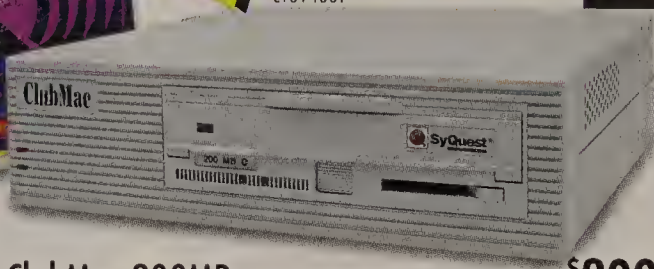
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S198 2001 EZ 135MB Drive



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C104 1801



\$299*

C104 1801

5.25" ClubMac 200MB Cartridge not included

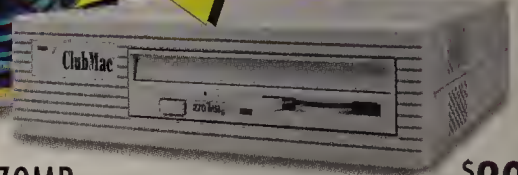
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5198 1014	270MB	\$57ea	\$56ea	\$55ea	5198 1011	88MB	\$44ea	\$43ea	\$42ea
5198 2001	135MB	\$19ea	\$18 ⁵⁰ ea	\$18ea	5198 1012	200MB	\$69ea	\$68ea	\$67ea



\$299*

C104 1801



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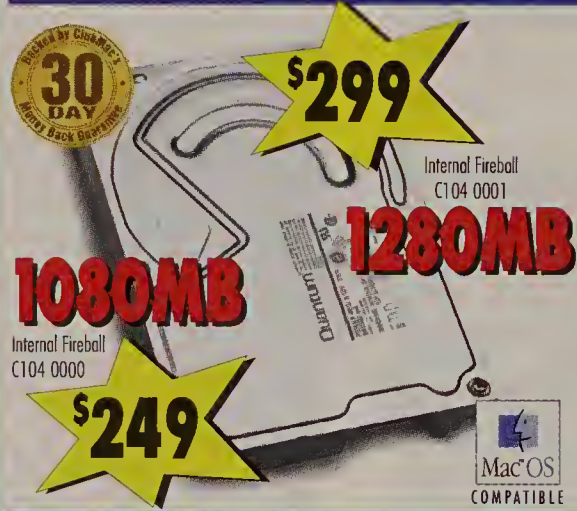
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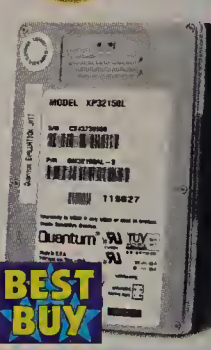


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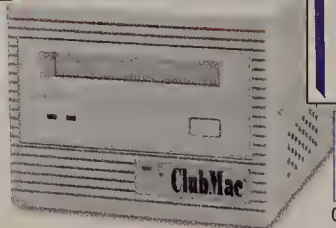
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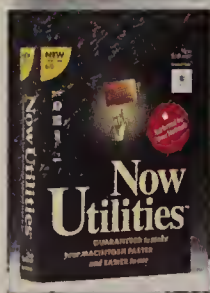
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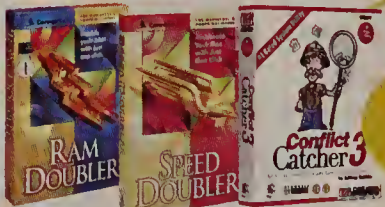
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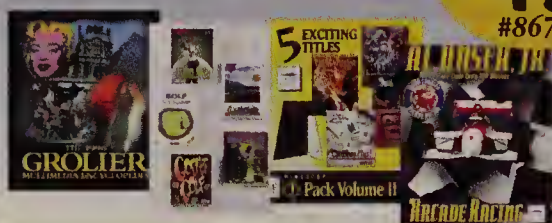
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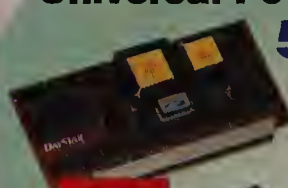


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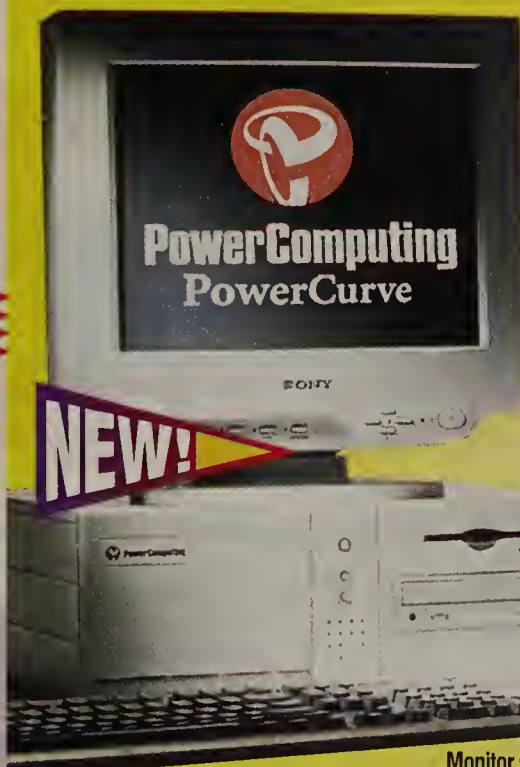
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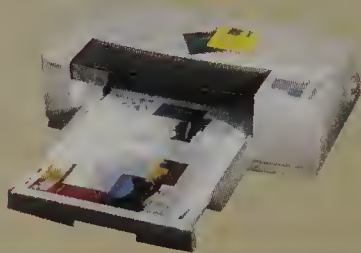
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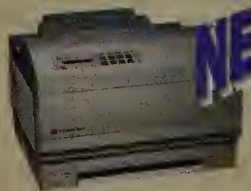
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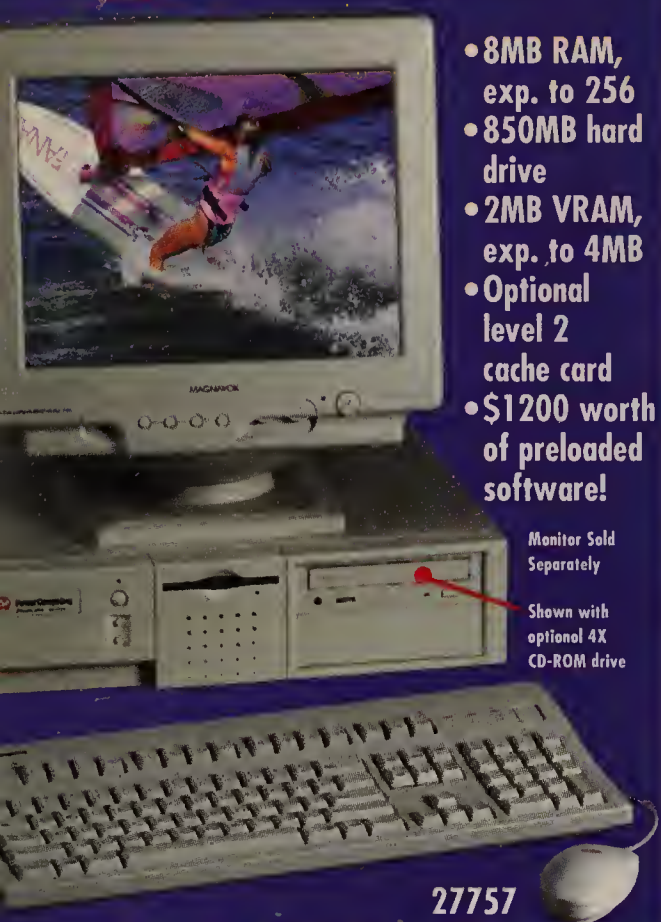
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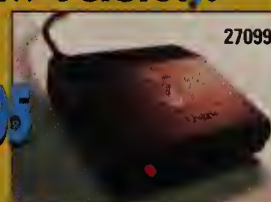
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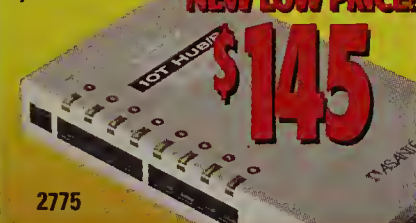
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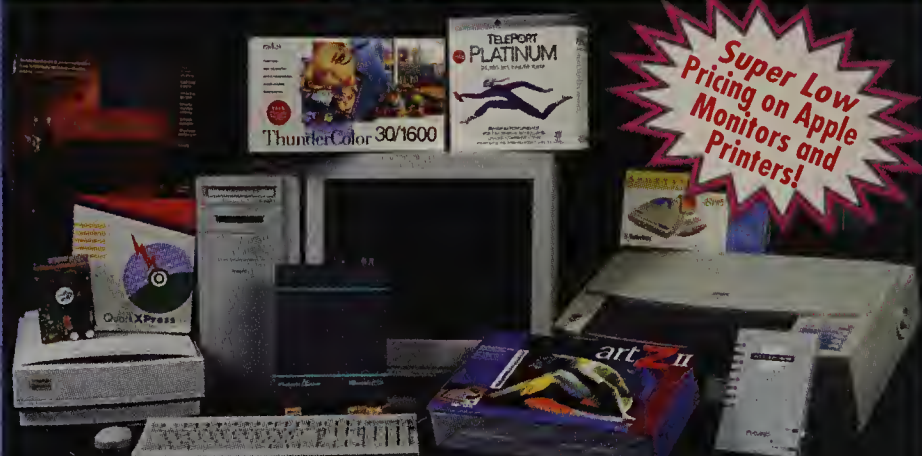
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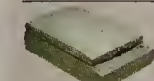
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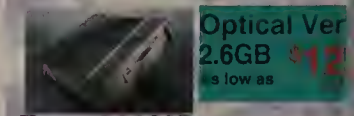
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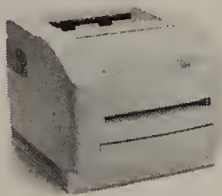
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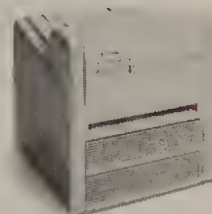
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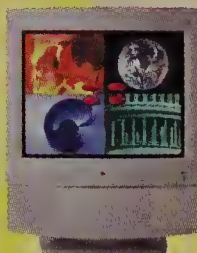
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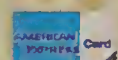
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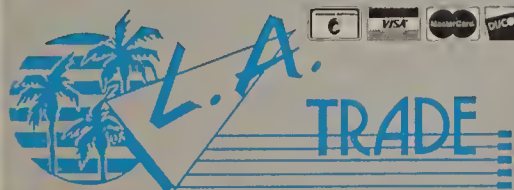
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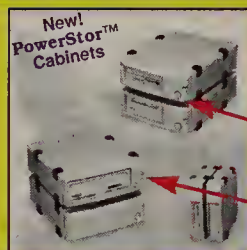
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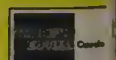
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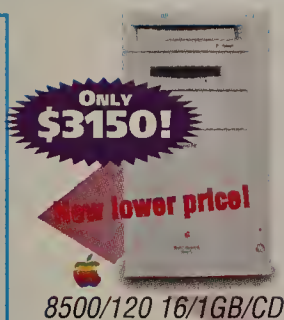
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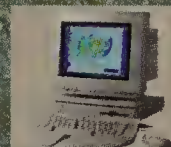
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7200 rpm PERFORMANCE, 5400 rpm PRICE

APS MS 2000 MICROPOLIS \$499⁹⁵

Internal configuration

- ✓ 7.31MB/sec. sust. write, 4.54MB/sec. sust. read
- ✓ 5400 rpm mechanism
- ✓ Performs like a 7200rpm drive
- ✓ 5-year warranty

That's right, this incredible drive has the performance you'd expect from a 7200 RPM mechanism but with a 5400RPM drive's price - and reliability! The APS MS 2000 formats to 2047MB; delivers sustained reads at up to 4.54 MB/sec. and sustained writes at up to 7.31 MB/sec; has an avg. access time of 20ms and avg. seek of 9.6ms.



1GB STORAGE FOR ONLY

APS I 1080 IBM \$229⁹⁵

Internal configuration

- ✓ Over 1GB capacity with Fast SCSI-2 interface
- ✓ IBM Magneto-Resistive (MR) head technology
- ✓ Low power requirements
- ✓ 5400 rpm mechanism
- ✓ 3-year warranty

An exceptional value, the high performance, low-power APS I 1080 delivers 1034MB of formatted capacity. A three-year warranty backs the APS I 1080, and it is rated at 350,000 hours MTBF.



APS DESKTOP DRIVES

Model	Capacity/Awards	Internal	SR2000
APS Q 840	811MB		
Quantum 840 Trailblazer	★★★★	\$199 ⁹⁵	\$299 ⁹⁵
APS I 1080	1034MB		
IBM Deskstar XP	★★★★	229 ⁹⁵	329 ⁹⁵
APS Q 1280	1222MB		
Quantum Fireball II 1280	★★★★	269 ⁹⁵	369 ⁹⁵
APS I 2160	2063MB		
IBM Ultrastar ES	★★★★	499 ⁹⁵	599 ⁹⁵
APS MS 2000	2000MB		
Micropolis 4421	★★★★	499 ⁹⁵	599 ⁹⁵
APS ST 4200	4094MB		
Seagate ST 15230N	★★★★	899 ⁹⁵	999 ⁹⁵



These products are performance-matched for optimal performance in the Power PC environment.

APS HIGH-PERFORMANCE DRIVES

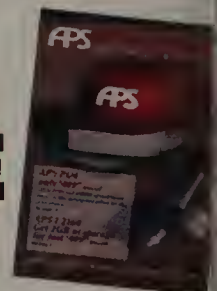
Model	Capacity/Awards	Internal	SR2000
APS MS 2.0	1955MB		
Micropolis 4221	★★★★	\$599 ⁹⁵	\$699 ⁹⁵
Fast/Wide or AV available for an additional \$100.00			
APS Q 2.0	2050MB		
Quantum Atlas XP32150	★★★★	699 ⁹⁵	799 ⁹⁵
Fast/Wide available for an additional \$100.00			
APS MS 4.0	4064MB		
Micropolis 3243	★★★★	999 ⁹⁵	1099 ⁹⁵
Fast/Wide or AV available for an additional \$100.00			
APS Q 4.0	4101MB		
Quantum Atlas XP3430	★★★★	999 ⁹⁵	1099 ⁹⁵
Fast/Wide available for an additional \$100.00			
APS MS 9.0	8669MB		
Micropolis 1991	★★★★	1899 ⁹⁵	2099 ⁹⁵
AV available for an additional \$100.00			

IDE POWERBOOK DRIVES

Model	Capacity/Features	Drive Type	Internal
APS PB 230 MO	217MB		
Fujitsu		IDE	\$399 ⁹⁵
APS Q 1.08	1037MB		
Quantum Europa	3800 rpm	Fast ATA2	474 ⁹⁵

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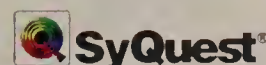
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APS SQ 3270



- ✓ Delivers fixed platter performance
- ✓ 2-year warranty
- ✓ Use 105MB or 270MB cartridges
- ✓ Perfect for desktop or powerbook computers

\$299⁹⁵*
External configuration

*Only with the purchase of one SQ 270 cartridge

The APS SQ 3270 gives you exceptional performance with 1.8MB per second sustained reads from its 3600 rpm mechanism. A 270MB SyQuest cartridge formats to 255MB and gives you the convenience of unlimited storage possibilities – just add more media as your storage needs grow.

While supplies last, order now!

	Capacity	Access	Seek	Read Trans.	Write Trans.	Warranty	Price per MB
APS SQ 3270	255MB	27ms	13ms	1.8m/sec.	1.6m/sec.	2-year	\$1.17
Zip	96MB	45ms	33ms	1.0m/sec.	1.0m/sec.	1-year	\$2.07
EZ135	128MB	27ms	13ms	1.1m/sec.	0.8m/sec.	1-year	\$1.80

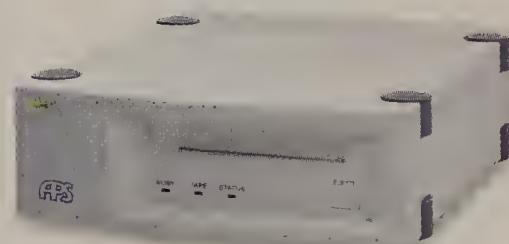
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APS DAT

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- ✓ Twice the speed of previous DAT – up to 19MB per minute
- ✓ Includes the latest 3.0 Retrospect backup software
- ✓ 2GB native capacity on 90m DAT tapes

JUST \$699⁹⁵
External configuration

The new APS DAT packs up to 2GB of uncompressed data on a 90m DAT tape at a speedy 19MB per minute. That's twice as fast as a standard DAT drive! You won't sacrifice speed or capacity when you backup to an APS DAT.



APS QIC & DAT BACKUP SYSTEMS

Model	Capacity/Awards	Internal	SR2000
APS HyperQIC	8GB **** MacWEEK LABS 4.5	N/A	\$499 ⁹⁵
Avan 4 Conner QIC 3095 Mech.			
APS DAT	2GB \$649 ⁹⁵		699 ⁹⁵
DS-1 Non-Compression Mech.			
APS HyperDAT	8GB 849 ⁹⁵		899 ⁹⁵
DS-1 Compression Mech.			
APS HyperDAT Pro	8GB 1049 ⁹⁵		1099 ⁹⁵
DS-2 High Speed Mech.			
APS DAT Loader600	48GB 2699 ⁹⁵		
Ideal for large unattended network backups	N/A		

APS MO DRIVES

Model	Capacity/Features	Awards	SR2000
APS 230MB MO	Up to 217MB	****	\$449 ⁹⁵
APS 1.3GB MO	4MB cache/Up to 1244MB		1699 ⁹⁵
APS 2.6GB MO	Double the storage of 1.3GB MO for just \$300 more		1999 ⁹⁵

- 30-day money-back guarantee on all APS brand products. Your risk is the cost of shipping.
- Drive-for-Drive Repair or Replacement Warranty. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- Refused orders subject to 20% restocking fee.
- Listed capacities are formatted
- Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
- Prices and specifications are subject to change without notice.
- All hard drives from APS Technologies come preformatted with Apple's System 7.0.1 software, and APS Technologies' APS PowerTools SCSI formatter/hard disk partitioner. You may need to install system software appropriate to your machine before use.
- Not responsible for typographical errors.
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APS CD-ROM DRIVES

Model	Awards	Internal	SR2000
APS T 3701	6.7X-speed CD-ROM		\$249 ⁹⁵ \$299 ⁹⁵
APS PD4*	4X CD-ROM/Optical	N/A	499 ⁹⁵
APS CD-R	Recordable CD-ROM	N/A	999 ⁹⁵
APS CD-R Pro	4X4 performance CD-R	N/A	1999 ⁹⁵

*Limited Supply

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90M DAT 3-pack with free cleaning cart.	\$29 ⁹⁵
128 MO 3-pack after \$20 rebate	\$74 ⁹⁵
230 MO 3-pack after \$20 rebate	\$89 ⁹⁵
SQ-400 (44MB)	\$49 ⁹⁵
SQ-800 (88MB)	\$59 ⁹⁵
SQ-310 (105MB)	\$64 ⁹⁵
SQ-327 (270MB)	\$69 ⁹⁵
SQ-2000 (200MB)	\$89 ⁹⁵

APS SYQUEST DRIVES

Model	Capacity/Awards	Internal	SR2000
APS SQ 3270	255MB **** LABS 4.5	N/A	\$299 ⁹⁵ *
APS SQ 5200	194MB **** LABS 4.5		\$339 389 ⁹⁵

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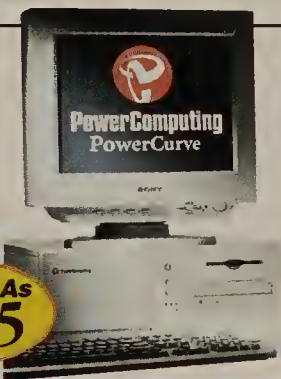
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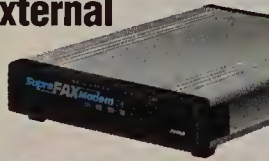
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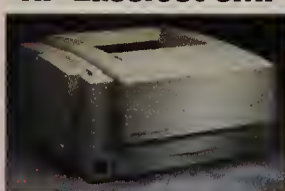


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88830	FileMaker Pro V3.0	\$179.98
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04670	Premiere V4.2	\$484.98
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92218	SuperPaint Deluxe 3.5	\$68.98
03497	Type Manager 3.8 PowerMac	\$38.98
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05827	StuffIt Deluxe 3.5	\$69.98
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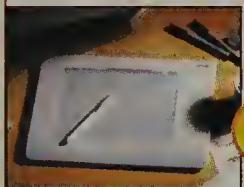
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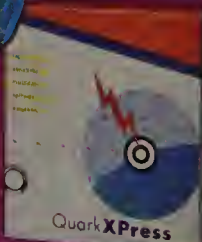
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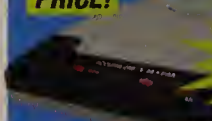
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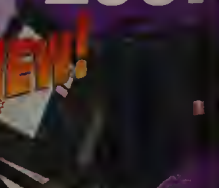
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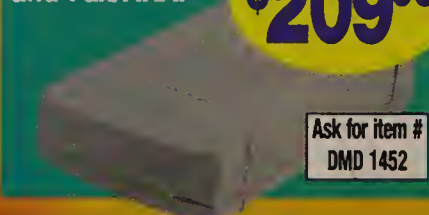


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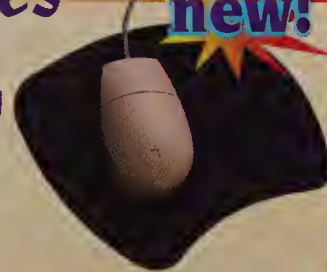
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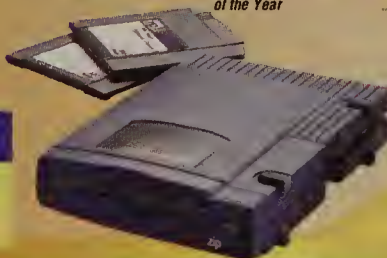
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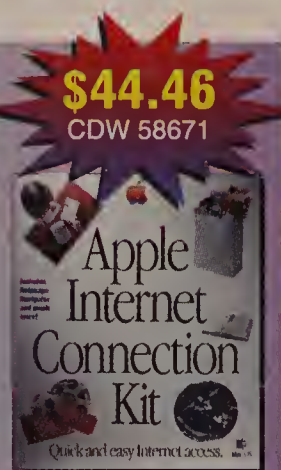


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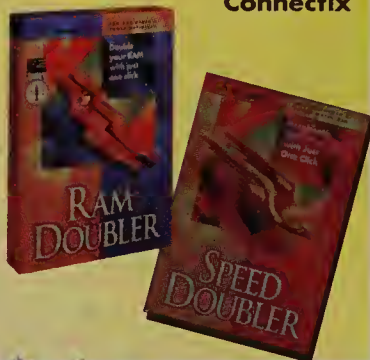
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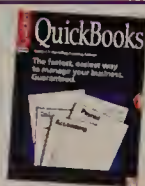
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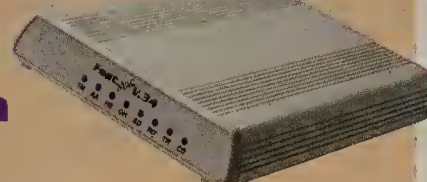
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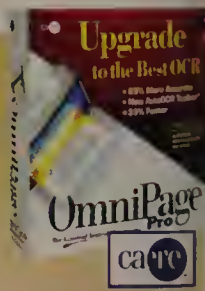
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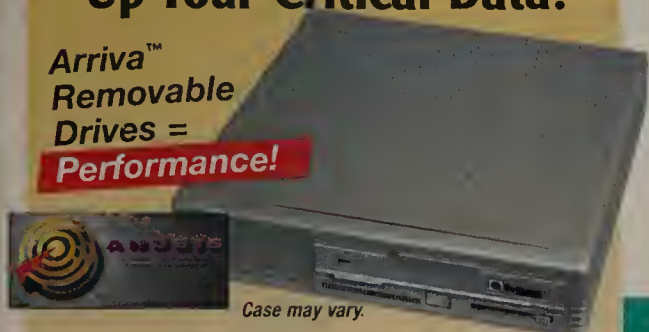


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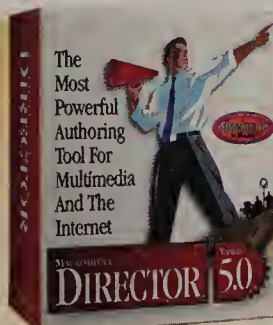
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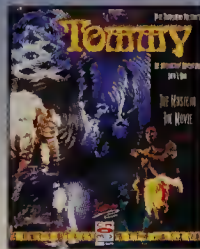
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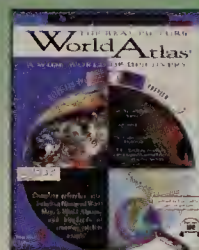


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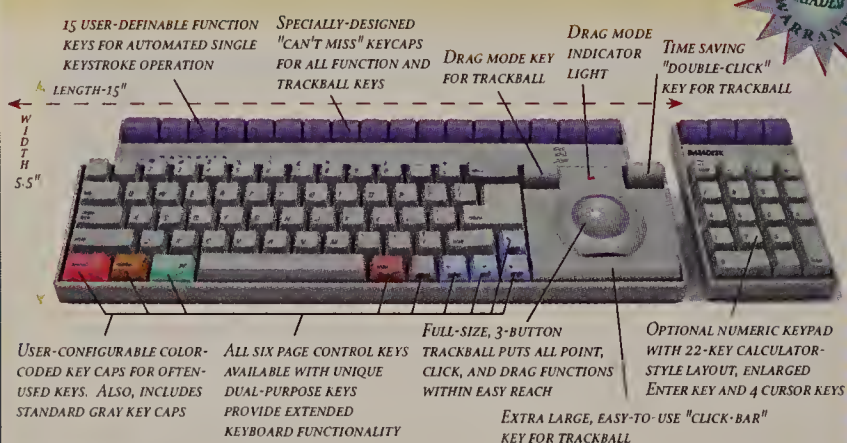
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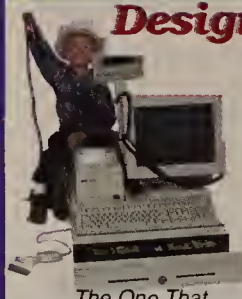
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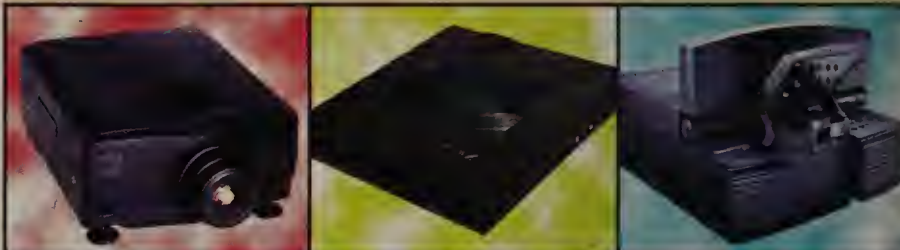
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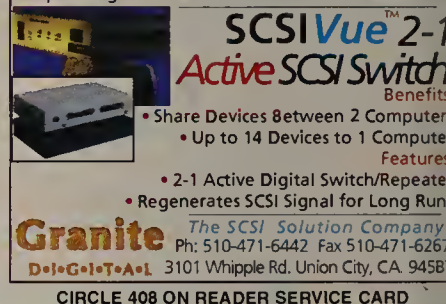
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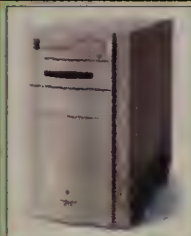
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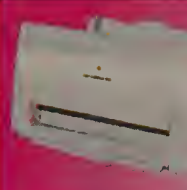
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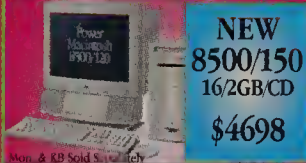
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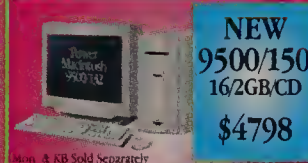
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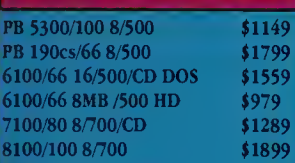
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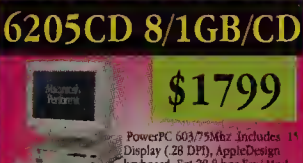
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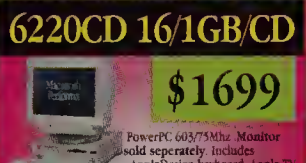
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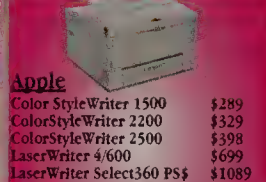


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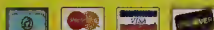
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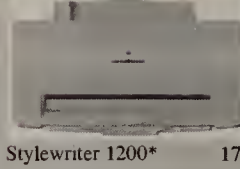
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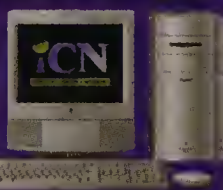
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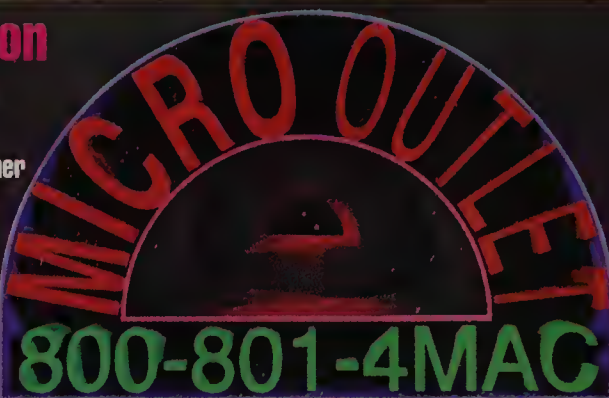
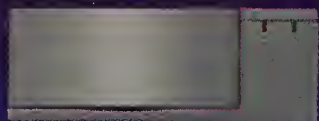
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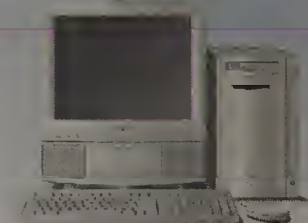


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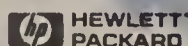
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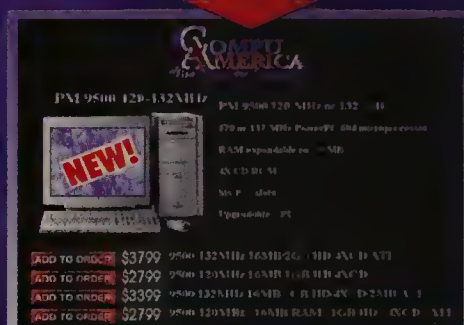
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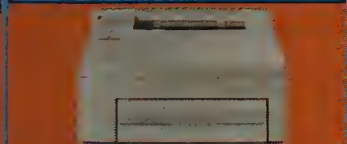
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


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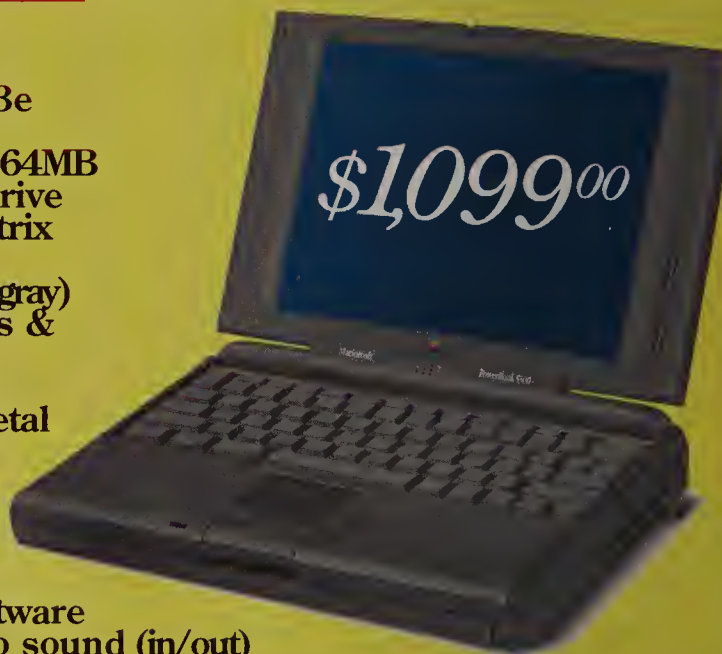
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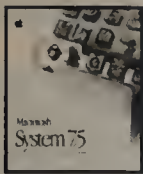
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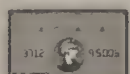
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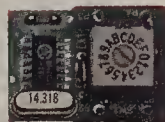
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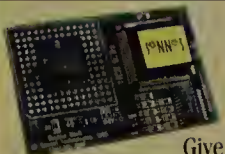
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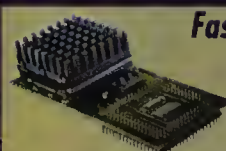
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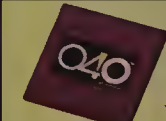
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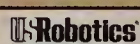
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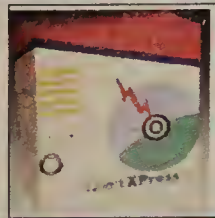
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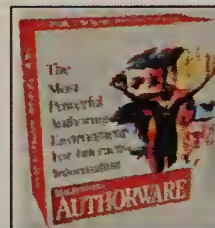
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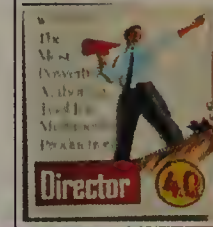
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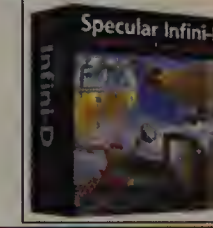
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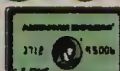
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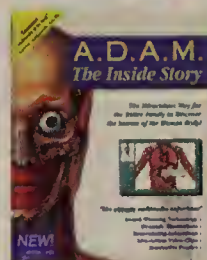
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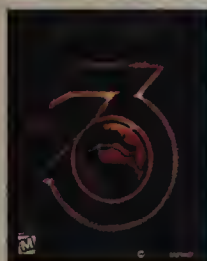
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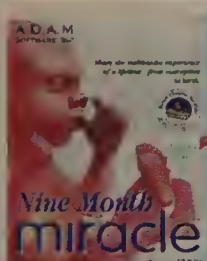
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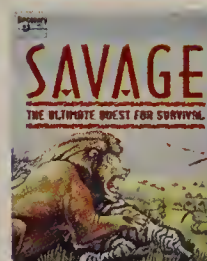
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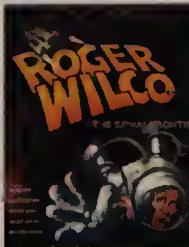
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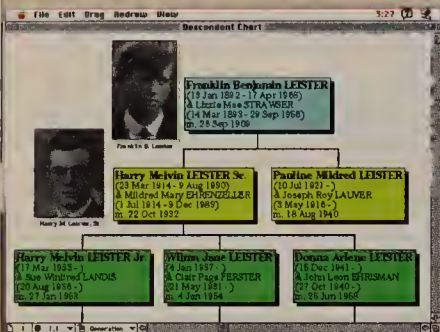
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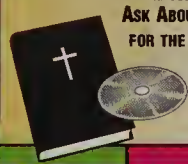
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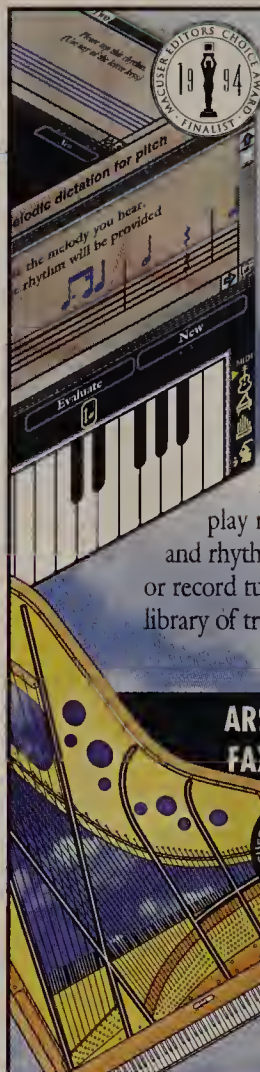


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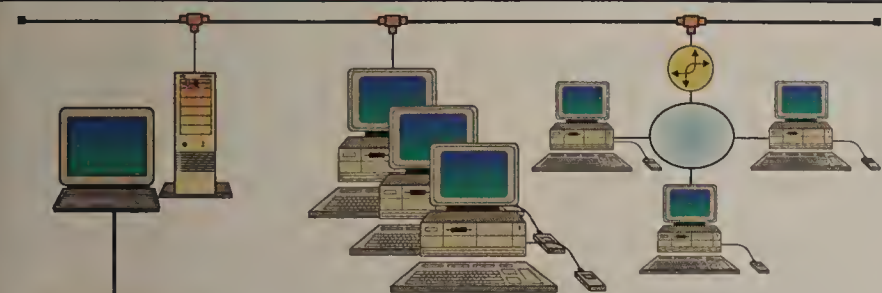
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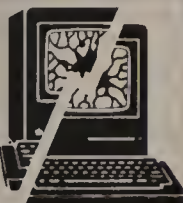
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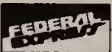
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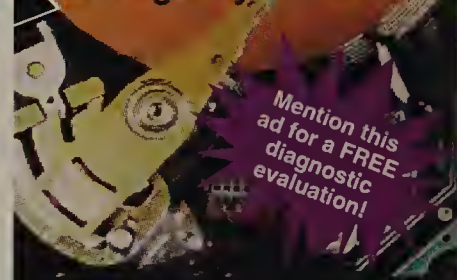
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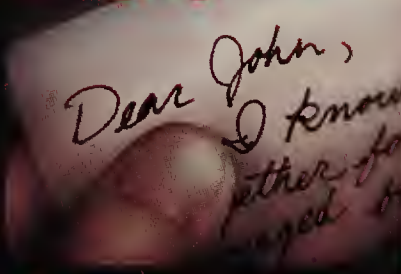
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Death and Mourning on the Internet

WILL THERE BE ANY E-MAIL IN HEAVEN?

DURING ONE OF MY radio broadcasts recently, I mentioned that a friend of mine had died. His name was Yuri Rubinsky, and he was 43 years old. A couple of days later, strange things began to happen. Yuri worked in the computer business, and after my brief eulogy my E-mail began to pile up with messages from people I didn't know but who had known Yuri. They were short notes but full of details. I knew Yuri too, they said. We met in high school. We listened to *Sergeant Pepper* together for the first time. He had a wild beard. That sort of thing.

Now, I'm normally no fan of the Internet. I find it slow, cumbersome, undeservingly opinionated, and obsessed with trivia and anonymous sex. It's touted as the democracy of cyberspace, and maybe that's true, but in my experience it's more often fractious and confusing. Yet, this was different. These messages about my late friend kept his spirit alive more vividly and more steadily than I'd experienced after the death of anyone else. Other times when friends died, I remembered them when I could. But in cyberspace, Yuri has never ceased to exist.

The Virtual Afterlife

Before long, Yuri had more of a presence in my computer than he'd had in my life these last few busy years. It was as if, over the Internet, people were still passing around his spirit. Or as if his ghost had spoken up. This was new to me. Yuri's death left a hole in me. But on the Internet, in this new computerized funeral parlor, the mourning ground of cyberspace, he often came to life again, turning up unexpectedly as he did in life (he was a very busy man and only visited when his schedule suddenly broke down).

What I was witnessing, though I hesitate to use the word, was a resurrection—

and a very believable one at that. The messages in my electronic mailbox were disembodied, as E-mail messages are. But they undeniably conveyed a spirit still warm from the sending. The mourners at this digital wake could open up to one another fearlessly, because we did so in the invisible realm of cyberspace. We didn't have to face one another as you must do at funerals, which is what makes them so terrifying.

The Digital Funeral

At a funeral, the mind fills with shocking, inappropriate thoughts: "How could he die this week, when I am so busy?" I think—only for a moment, but the thought does occur. Funerals are a thousand agonizing moments like that. And the worst



moments of all are facing the loved ones left behind. I embrace the mother whose son has died and feel her flesh beneath my hands, squeezing into the spaces between my fingers, and think, "Why am I noticing her body at this terrible time? What's wrong with me?" Of course this is nothing to be ashamed of. It's not sex, after all, just the comfort the living body provides in the face of death. As if a hole has opened in the ground and swallowed one of us, and as much as we miss the person who slipped away, we don't want anyone else to go, and so we hold on.

Internet Heaven

This tension we experience as our attention struggles between mourning the dead and holding on to the living reminds us what it is to be alive—and therefore what death is. None of that human fray enters into the funeral parlor of cyberspace, though of course no one would want to replace a real funeral with E-mail. Internet grieving has a different function.

Within a few days after the cyber-eulogies started to float in, I began to understand what that function was. Like other friends of Yuri's, I found myself reluctant to delete his E-mail address from my computer. I still haven't. And I think my hesitation signifies something new to this technological time and age we live in, something radical.

My friend (our friend, if I include my fellow mourners in cyberspace) is gone. But Yuri's E-mail address—his location in the not-quite-real, yet more than unreal, ether of cyberspace—is still there.

If the place where he used to be, where he could be reached in cyberspace, is still there, who is to say that he is not there now? How is the living memory of him on the Net any less real or corporeal than his presence was on the Net while he lived? Then he was there, but not there; now, he is not there, but he's there.

He can't answer back; others have to answer for him. But that's the only difference, physically. In computer space, we are all auras and phantoms and ghosts, whether we are living or dead. And that makes the Internet, the virtual grave, the closest thing to an afterlife that many of us may know. Maybe the Internet can become our heaven. **m**

IAN BROWN is the host of *Sunday Morning* on CBC Radio. He lives in Toronto. His most recent book is *Man Medium Rare: Sex, Guns and Other Perversions of Masculinity* (Penguin Books, 1995). The Yuri Rubinsky Insight Foundation (otis@sq.com) has been established to finance and develop research on new uses for digital information.

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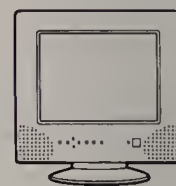
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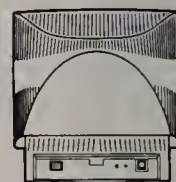
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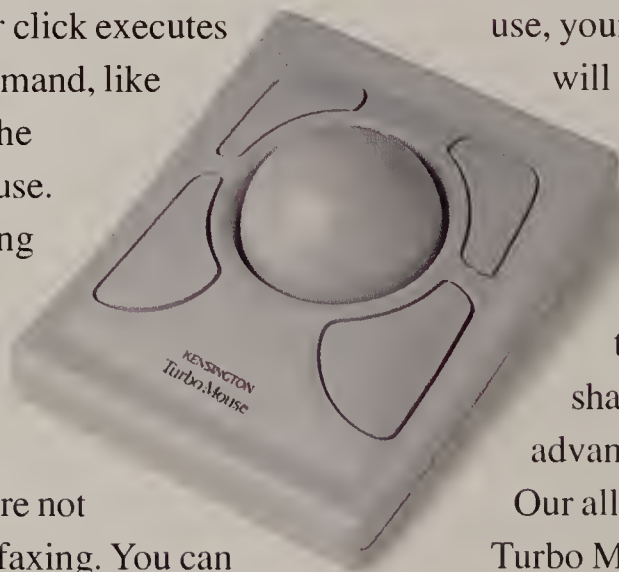
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